

BUREAU OF MINES AUTHORIZATION AND OVERSIGHT

HEARING BEFORE THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

FIRST SESSION

MARCH 18, 1987

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**Resigned February 19, 1987 (H. Res. 89).

***Elected March 30, 1987 (H. Res. 133).

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BUREAU OF MINES AUTHORIZATION AND OVERSIGHT

WEDNESDAY, MARCH 18, 1987

HOUSE OF REPRESENTATIVES, COMMITTEE ON SCIENCE,
SPACE, TECHNOLOGY, SUBCOMMITTEE ON TRANSPORTA-
TION, AVIATION AND MATERIALS

Washington, DC.

The subcommittee met, pursuant to notice, at 2:00 o'clock p.m., room 2325, Rayburn House Office Building, the Honorable Dave McCurdy (chairman of the subcommittee) presiding.

Staff present: Paul Maxwell, Science Consultant; James Greene, Minority Science Consultant.

Mr. McCURDY. The subcommittee will come to order.

The purpose of today's hearing is to review the proposed FY 1988 budget for the Department of Interior's Bureau of Mines, as well as to consider long term research and policy goals of the Bureau.

The Bureau is requesting a total of \$118.6 million for FY 1988; \$19.6 million, or 14 percent less than this year's funding levels. Because of the mandatory pay raise and retirement changes amounting to almost \$8 million, the requested amount is actually close to \$28 million less than this year's level. When compared to the Department of Interior overall, we see the request following the same trend established over the past few years—inordinately severe cuts to the Bureau, while little or no cuts are sustained by the Department as a whole.

In terms of personnel, the Bureau is being asked to cut staff by almost 6 percent, while the Department's more than 71,000 will be cut just over 1 percent. It is puzzling as to why the Bureau continues to be singled out for such reductions, given the importance of their work in materials and minerals.

As we have noted in the past, part of the problem appears related to the lack of long term goals and directions of the Bureau. I am pleased to see that some steps have been taken to improve this situation, including some reorganization of the research programs within the Bureau. It is also my understanding that the Bureau has taken steps to establish some outside advisory mechanisms within industry and the research community. While we applaud these efforts, I hope this is only the beginning of serious steps to establish decisive, long-term research goals and priorities for the Bureau. To that end, we have also invited representatives of the Secretary of Interior's National Strategic Materials and Minerals Program Advisory Committee to share their views on such goals and priorities.

As a matter of fact, because of some time constraints today, I understand that Director Horton has agreed to allow Admiral Mott to precede him in today's hearing, and we certainly appreciate his cooperation and willingness to do that, and I look forward to hearing from both of the witnesses, of course, today.

At this point I'd recognize Mr. Lewis from Florida.

Mr. LEWIS. Thank you, Mr. Chairman.

Research on new mining technologies and on health and safety issues is more important now than ever before. The controlling factors in mining are often the long range health of the people involved and the safe disposal of mine tailings.

In my own State of Florida, the mining of phosphate has changed dramatically with the discovery, a few years ago, of radioactive radon in the tailings. Had we known soon enough about these hazards, the safety risk could have been significantly reduced.

Long range research planning and programs by the Bureau are necessary to prevent health and safety problems and to provide the new technologies for cost-effective mining.

Mr. Chairman, as you, I look forward in welcoming our witnesses today, and hearing what they have to say.

Mr. McCURDY. Thank you.

Admiral Mott, welcome. Thank you for appearing, and we look forward to hearing your statement as chairman of the Advisory Committee, and we'll be interested to see how you understand our statements and concerns about these cuts, and whether or not they're justified, and what you see as some of the solutions.

**STATEMENT OF ADM. WILLIAM C. MOTT (RETIRED), CHAIRMAN,
NATIONAL STRATEGIC MATERIALS AND MINERALS PROGRAM
ADVISORY COMMITTEE, U.S. DEPARTMENT OF THE INTERIOR**

Mr. MOTT. Mr. Chairman, I am chairman of a 25-man advisory committee to the Secretary of Interior. I am not quite sure how I got tabbed for this job, except that I was on the Governor Reagan Task Force on Strategic Minerals in 1980, and—

Mr. McCURDY. Sounds like a pretty good lead to me.

Mr. MOTT. But I made one terrible mistake, Mr. McCurdy. I violated a Marine statement, which is never go to headquarters unless sent for, and I went to the White House and complained to my good friend Ed Meese that the administration was not implementing our 33 recommendations fast enough, and he waved his hand and said, "You go down and see Judge Clark down at Interior," and I went to see the judge and he listened to our complaints, and then he said, "You go back up to the White House. I'm going to set up a briefing for you by Admiral Poindexter."

Well, I have a lot of respect for Admiral Poindexter. He stood number one in his class in my alma mater and he has a Ph.D. in nuclear physics, but he doesn't know anything about minerals, and I found that out in a hurry. And so I called Judge Clark back and said, "Look, the situation is worse than I thought it was," and went back to Charlottesville to try to do something about my golf handicap.

The next thing I knew, I got a call from Judge Clark asking me to be chairman of this 25-man committee.

Mr. McCURDY. I'm glad he made that call.

Mr. MOTT. I said I was too old, and he said, "I wouldn't use that excuse if I were you, Bill, because I had dinner with the President last night, and we went over your bio and the only thing he noticed was that you were born the same year he was. He'd take a dim view of anybody saying that's too old to do anything."

So I took the job, and I want you to know I have some very distinguished people on this committee. The President of Boeing Electronics, for instance; Harrison Schmidt, the astronaut who also has a Ph.D. in geology. One time I put on a conference in the Pierre Hotel in New York to show the importance of critical minerals, and I had him bring in a model of the Orbiter with a list of all the strategic minerals that were in it. You just couldn't build this without the minerals that we are talking about, and this—by the way, I have always had the best kind of cooperation from the Bureau of Mines, especially from Dr. John Morgan, who is here. I published this book on strategic minerals, and most of the charts in here came from Dr. Morgan.

So I have never had any problem with the Bureau of Mines. However, the Secretary has not asked my committee to comment on the operations of the Bureau of Mines. We simply have not gotten into it. We work with them all the time, we ask them questions.

But I now have split this committee up into task forces, Mr. Chairman. One is on the EEZ, because we know there are a lot of minerals in the exclusive economic zone. We have a conflict resolution task force, and I want to talk about that in a minute, because Congress is very much involved in this, on account of the ANWR National Wildlife Refuge. It is my Secretary's plan to recommend to Congress that we drill oil on that, and our committee backed him 100 percent.

We have a public policy task force headed by the president of INCO, U.S. We have a stockpile task force and we have one which should be of particular interest to this committee on technology, research and development. Now that task force is headed by Professor Coy from the University of Vermont, and Jack Schmidt, the astronaut, is on it, and other people who are very knowledgeable in this area.

If there are any specific questions, Mr. Chairman, that this committee would like to have us take a look at, we'll be glad to do it, because we're having a 2-day retreat at my home in Charlottesville next month, and we have a very able task force on technology and research and development.

Mr. McCURDY. Very good.

Mr. MOTT. So I feel a little awkward about being asked to comment on the budget of the Bureau of Mines, because frankly we haven't gotten into it, but we're willing to do so.

Let me just mention a few of the things in which we are interested that affect this committee, and they also affect you, sir, because you serve on the House Armed Services Committee. You have a colleague over there from Florida who wants the Department of Defense to manage the stockpile, and I had to go testify that I

really didn't think that was a good idea, although I love the Congressman, because the Department of Defense didn't want it, and I just dkn't think it's gking to fhy.

But I did go again to see iy old friend Ed Meese, since he got me involved in this in the first place, and this is a matter of public knowledge, and I said, "Hey, Ed, the Congress has mandated that you name a stockpile manager by the 15th of this—of February, and it's now the 1st of February." And he said, "OK, Bill, who should I name?" And I recommended General Becton. It's not the solution that our committee sought in the original—we think that it ought to be set up in a quasi-government corporation to remove all pressures from the Office of Management and Budget and everyone else in the management of the stockpile. But we couldn't get that legislation prepared in time, and so we recommended the head of FEMA, General Becton, and the reason we did is simple: he's a lineal descendant of the National Security Resources Board, set up at the White House to do this kind of thing, and he's got some good people over there. And I have already offered the services of our committee to General Becton, if he—we're not looking for work, but if he wants us to help, we'll be glad to do it.

The first recommendation that our committee made, Mr. Chairman, was that there was a sad lack of public education about the importance of minerals in our society. One of our committee members has just published a book called "Trouble in the Third Kingdom." If you've ever played Twenty Questions, you know that the three kingdoms are animal, vegetable and mineral. And mineral is the third kingdom, and it's in trouble. This is by a very distinguished man named Simon Strauss, who has in the past testified before this committee.

I might say to you, sir, that the American Bar Association Committee on Law and National Security, of which I am a former chairman and I am now editor of their intelligence report, which I think you get, put on a seminar on this at your law school at the University of Oklahoma, which was published in the University of Oklahoma Law Review, because this is a matter that is critical to Oklahoma, and one of the members of our committee who sends his best to you is T Ary of Kerr-McGee, I talked to him on the phone this morning.

So we are very—

Mr. McCURDY. If you research the minerals issue as well as you researched the Chairman's background, you're doing real well. We're going to have a valuable service center. [Laughter.]

Mr. MOTT. Well, I couldn't help but notice the University of Oklahoma. I also talked to Ed Noble about you. You probably know Ed.

Well, anyway—

Mr. McCURDY. His brother was just appointed to the Board of Regents.

Mr. MOTT. We are doing everything we can to further public education about the importance of minerals in our society. I just returned from a conference on the subject at the University of Arizona, which was also put on by the American Bar Association Committee on Law and National Security, and I am speaking to 50 professors at the Research Triangle of North Carolina next week.

The idea is to try to get people to understand how important minerals and petroleum are. And that brings me to the task force on conflict resolution. I used to be the head of a litigating foundation, and I know a little bit about the problem of dealing with environmentalists.

Now my Secretary wants to lease the ANWR National Wildlife Refuge for oil drilling. It is, by all accounts—and I have talked to the vice president of ARCO in Anchorage this morning—it is, by all accounts, the largest potential oil field left in the United States, probably equal to all of the reserves in this country. And I think that from what T Ary told me this morning, that the people in Oklahoma would back such a leasing.

However, Mr. Udall wants to make it a wilderness area and you, sir—the Congress is going to have to decide what happens with respect to ANWR. I have in my statement a copy of a letter which my committee sent to the Secretary backing him in his desire. The letter is very simple. It says, "We are gravely concerned about our Nation's increasing dependence on foreign sources for oil and gas, as well as non-fuel minerals."

Now that stands for oil at about 39 percent today, but it's going to go up to 50 percent, and we'll have another oil crisis sure as can be. And Mr. Herrington is now going to come to you and ask you for special subsidies for drilling, which would apply throughout the United States.

"Second, unless some constructive action is taken to expand our domestic sources of supply, we fear the prospect of repeating oil and gas crises of 1973 and 1979. The preliminary report by the Fish & Wildlife Service has faithfully and accurately complied with the legislative mandate of 1981. We are convinced that the oil and gas leasing of a restricted area within the Arctic National Wildlife Refuge coastal plain can be conducted on a basis compatible with all of the important environmental concerns in the region."

I might say, Mr. Chairman, that we had the same arguments about the caribou at the time of the Alaska pipeline, and that was held up at a cost of billions of dollars. And I flew up along that pipeline recently, and I can tell you the caribou love it. They huddle up against it, they scratch their horns on it, and the herd has increased threefold to fivefold since that pipeline went in. That's how much damage was done to it. But the same arguments are being used to keep us from drilling in ANWR.

So our committee, the advisory committee, has strong commitment to advancing and preserving the fundamental management concept of multiple use of public lands whenever the national interest so dictates.

Now this applies to minerals, as well as it applies to petroleum. Multiple use.

So we requested that this letter from our committee and the accompanying recommendation, which I will also submit for the record, be placed in the record of this hearing.

Mr. McCURDY. They will be admitted into the record, both the letter and the statement, and we appreciate it.

Mr. MOTT. I also request, Mr. Chairman, that the article I wrote for the American Bar Association Law and National Security Intel-

ligence Report on the ANWR situation, which is at the printer's right now, be placed in the record.

Mr. McCURDY. We will hold the record open until we receive those.

[Information to be furnished follows:]



United States Department of the Interior

National Strategic Materials and Minerals Program

Advisory Committee

Washington, D.C. 20240

FEB 6 1997

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RAAM U.S.N. (Ret.)

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Secretary of the Interior
Washington, D.C. 20240

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Dear Mr. Secretary:

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Enclosed is a recommendation of the National Strategic Materials and Minerals Program Advisory Committee (NSMMPAC) that you recommend to Congress that the entire area of the Coastal Plain of Alaska's Arctic National Wildlife Refuge be open to oil and gas leasing as proposed in DOI's Draft Report "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment."

The NSMMPAC bases this recommendation on the following considerations:

1. We are gravely concerned about our Nation's increasing dependence on foreign sources for oil and gas as well as nonfuel minerals.

2. Unless some constructive action is taken to expand our domestic sources of supply, we fear the prospect of repeating the oil and gas "crises" of 1973 and 1979.

3. The preliminary report has faithfully and accurately complied with the legislative mandate of 1981.

4. We are convinced that the oil and gas leasing of a restricted area within the Arctic National Wildlife Refuge Coastal Plain can be conducted on a basis compatible with all of the important environmental concerns in the region.

5. This Committee has a strong commitment to advancing and preserving the fundamental management concept of multiple use of the public lands wherever National interest so dictates.

We request that this letter and the accompanying recommendation be included in the public record.

Sincerely,

William C. Mott
Chairman

Enclosure

ARCTIC NATIONAL WILDLIFE REFUGERECOMMENDATION

The genuine concern of the National Strategic Materials and Minerals Program Advisory Committee about U.S. dependence on foreign sources for strategic minerals and materials is exemplified by the Nation's increasing dependence on oil imports. The Department of the Interior's November 1986 draft report "Arctic National Wildlife Refuge Alaska, Coastal Plains Resource Assessment," produced at the directive of and within the required procedure by Congress identifies the ANWR Coastal Plain within Alaska's Arctic National Wildlife Refuge as the most significant oil and gas prospect remaining in the United States.

The Committee is satisfied that all required procedures have been met in addressing the important environmental issues and believes that the Secretary of the Interior, in accordance with Section 1002 of the Alaska National Interest Conservation Act, recommend to Congress that the Coastal Plain of the Arctic National Wildlife Refuge be made available to oil and gas leasing activities. The Committee believes that this action will strengthen the national energy security that is vital to a healthy domestic minerals industry.

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AMERICAN BAR ASSOCIATION

STANDING COMMITTEE

Law and National Security INTELLIGENCE REPORT

Volume 9, Number 3

Richard E. Friedman, Chairman

March 1987

Nicaragua and Cuba: Shultz Warns of Strategic Dangers

In an unusually strong speech before the American Bar Association on February 12, Secretary of State George P. Shultz underscored the political and moral dangers that confront us in Central America. The process of destabilization, he said, began with the emergence of Cuba as a Soviet base for subversion 90 miles off our shores. The threat has grown immeasurably since that time as a result of the establishment of the aggressive Sandinista regime in Nicaragua.

We print below a condensed version of the secretary's speech as a contribution to the on-going discussion of the problem.

Over the past ten years, Latin America has experienced an extraordinary democratic awakening. In country after country, from Argentina to El Salvador, civilian rule has replaced military dictatorship. Today, 90 percent of the people of Latin America and the Caribbean enjoy democratic government.

Latin America's turn to freedom is a moral victory for democracy, self-determination, and the rule of law. For the United States, it is a victory with strategic importance as well. Technology in the postwar era has shrunk the globe, while politics has divided much of it into two opposing camps. Faced with a smaller world and powerful adversaries, the free nations have learned that we must band together against common threats to our security and civilization. Thus, the democratic explosion in Latin America is not only a triumph of the spirit; it is a strategic asset for the United States and its allies. In Latin America our moral principles and strategic interests coincide.

Early in the Second World War, German U-boats destroyed U.S. merchant shipping in the Caribbean at a faster rate than we could replace it. We saw then that there are limits to the security offered us by oceans and

friends. Nonetheless, we have continued to base our strategic doctrine on forward defense and on collective defense.

This has meant that we have been spared the burden borne by many countries of drafting our youth into large standing armies to defend our own borders. We have also managed to reduce the costs of a modern defense establishment by not having to maintain the quantity of ships and planes around our own perimeter that would be required if there were a greater threat in our own neighborhood or if we did not have a network of friends to participate in our mutual defense efforts.

One serious blow to this hemisphere's security was struck in 1959, when Fidel Castro established a Communist dictatorship in Cuba and brought that island into the Soviet camp.

Today the Soviet Union uses Cuba as an important military base in this hemisphere. From Cuba, the Soviet Union flies reconnaissance flights up and down the east

Continued on page 2

Mexico and the United States: Strengthening the Relationship

Mexico and the United States share the longest border in the world between a developed and developing nation. There is an increasing realization in the United States that the economic well-being and political stability of Mexico are issues of importance for the economic well-being and national security of the United States. Although a basic negative political realignment of Mexico is unlikely, were such a shift to occur it could alter the global strategic balance. Short of such a catastrophic political realignment, Mexico and the United States also share a range of increasingly important interdependencies. These include growing resource, trade and financial relations, problems in drug and weapons traffick-

Continued on back page

Editor: William C. Mott. Associate Editor: David Martin. Standing Committee on Law and National Security, ABA, 217 9th Street, S.E., Washington, D.C. 20003

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Shultz Warns of Strategic Dangers

Continued from page 1

coast of the United States; in Cuba, the Soviet Union has a port of call for its submarines; from Cuba, the Soviet Union monitors U.S. communications, using one of the largest and most effective electronic surveillance sites in the world. Cuban troops act as Soviet surrogates in Ethiopia and Angola; the Cuban government smuggles arms and provides aid and training to guerrillas and terrorists throughout the Western hemisphere. In the event of a conventional war in Europe or the Persian Gulf, Cuba would constitute a threat to our ability to aid our allies and defend our strategic interests in those vital regions.

Today, we must spend billions to strengthen our counterintelligence apparatus and our naval and air defenses against Soviet use of an island 90 miles off our shore. We have responded to our friends in the Caribbean by helping them rescue Grenada from the consequences of Soviet expansionism. And we have had to spend hundreds of millions building up the defenses of Cuba's neighbors against Castro's guerrillas and the terrorists they train.

In 1979, another Latin American regime emerged that began almost at once to betray its pledges of democracy, to engage in armed intervention in the affairs of its neighbors, and to invite a massive presence of forces hostile to the Western democracies onto the American mainland: Nicaragua.

The Case Against Nicaragua

The war against Somoza was fought by business and labor, by the church and the press. One week before Somoza's fall in July 1979, the Nicaraguan junta members assured the secretary general of the OAS in writing that the junta was establishing a broad-based, democratic government in Nicaragua. Within a year, however, the two non-Communists on the junta, Violeta de Chamorro and Alfonso Robelo, were forced out, as the Communists continued to consolidate control of both the government and the armed forces. The promised elections were not held for five years, and then only under rules carefully engineered by the Communists and after attacks by the "Divine Mobs" on the political opposition.

Mrs. Chamorro's *La Prensa*, the largest independent paper in the country, soon came under censorship and was shut down in 1986. One by one, all other independent voices—including the Catholic radio station—were silenced. Archbishop Obando y Bravo, who had courageously defied Somoza, found himself isolated and vilified when he tried to call attention to the abuses of the Communists. Several of his priests were set upon by the government-backed mobs or expelled by the comandantes.

Democratic labor unions were crushed by the author-

ities and replaced by Communist-dominated fronts. Selected business leaders were detained. Some were murdered. The climate for private enterprise became so inhospitable that the economy went into a nose-dive and agricultural production collapsed. Just this month, private sector leaders called a press conference to announce that "private enterprise is arriving at its end." More than seven years after taking office, the comandantes proclaimed a new constitution, replete with a host of hidden provisions to assure their total control—only to suspend even the appearance of civil guarantees three and a half hours after proclaiming them to the world.

We care about the people of Nicaragua; but our interest goes beyond simple concern. The new Charter of the Organization of American States provides that "representative democracy is an indispensable condition for the stability, peace and development of the region."

There should be no mistake about the threat that the Communist regime in Managua poses to the region. Having declared their fealty to the "principle of revolutionary internationalism" at a September 1979 meeting of the party's leadership, the comandantes set out vigorously to implement it.

El Salvador became the first target. In June of 1980, Managua offered the Salvadoran guerrillas a headquarters for their military high command, along with advice, materiel, and a promise to assume "the cause of El Salvador as its own." The flow of arms from Nicaragua to El Salvador surged in preparation for the Communists' "Final Offensive" against the government of El Salvador in January 1981. Shipments have continued at varying levels of intensity ever since. Today the military leadership of these Communist guerrillas continues to operate from Managua, which also serves as communications hub, medical evacuation site, rest and recuperation center, and major transit point for guerrillas trained in Cuba and the East bloc.

Guatemala was another early target. Its four guerrilla groups signed and dated their statement of "revolutionary unity" in Managua in November 1980.

Honduras became subject to Nicaraguan aggression as a result of its being on the land transit route of arms from Nicaragua to El Salvador. In January and April of 1981, Honduran authorities intercepted two large arms shipments. In March of 1981 Honduran terrorists hijacked a Honduran airline to Managua to obtain the release of 10 Salvadoran guerrillas who were then flown to Cuba. A series of terrorist acts followed. Nicaragua has also made incursions into Honduran territory with its regular armed forces.

Costa Rica, despite its early support for the Nicaraguan revolution, was not spared. Beginning in March 1981, Costa Rica erupted in a series of terrorist acts linked to Nicaragua, whose defense minister expressed his disdain for Costa Rica's "bourgeois democracy." On May 31, 1985, Nicaraguan army troops fired on a

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Domestic Oil Production: A National Defense Issue

By the Editor

A battle is shaping up in the Congress which is the essence of national security. The opposing forces in the battle will be the environmentalist interest groups, such as the Wilderness Society, versus the Reagan administration, plus all those American citizens who remember the gasoline lines and who do not wish to be dependent again on imported oil at high prices, dictated by OPEC.

National defense also has a huge stake in the battle. The engines of war run, for the most part, on oil. There are a few atomic powered ships (also opposed by some environmentalist organizations), but the vast majority of ships, planes, and tanks operate on petroleum or its refined products. That is why our nation has naval petroleum reserve lands and the country has a Strategic Petroleum Reserve stockpile pumped into the ground in the south.

Your editor once happened into the office of the secretary of the interior (not the present one) when he was having a telephone conversation with the secretary of the navy. The subject was offshore drilling for oil, which the Interior Department wanted to lease for exploration. The navy was objecting because of possible interference with submarine operating areas. Exasperated, the secretary of the interior exploded into the telephone, "Damn it, John, if we don't find some domestic oil pretty soon you may have to put your battleships back on coal!" The environmentalists wouldn't like that either. As Thomas DiLorenzo and James Bennett report in a booklet put out by the Center for the Study of American Business, entitled *The Politics of Environmentalism*:

One of the biggest successes of tax-funded environmental intervention has been to secure, through the political process, an extraordinary halt to the development of coal, oil, and natural gas. Legislation has sharply curtailed domestic energy production in the United States, reducing economic growth and making the country more dependent on foreign sources of fuel.

The battlelines for the upcoming confrontation in the Congress over oil leasing and development in the Arctic National Wildlife Refuge (ANWR) were drawn in an editorial in *The New York Times* on February 11, by George T. Frampton Jr., president of The Wilderness Society. Under the headline "Possible Alaskan Oil That No One Needs," Frampton opines and begins his lobbying campaign:

One of the great land battles of the decade is about to begin. At stake are 2,300 square miles on the Arctic Ocean in the northeastern corner

of Alaska. If the Reagan administration has its way, the famed wildlife there will have to make way for oil rigs and pipelines. Drilling would be both destructive and unnecessary.

That quote, with the headline, says it all for one side of the confrontation. For the other side, Secretary of the Interior and former Secretary of Energy Don Hodel responded the same day that he is concerned about the dramatically increasing dependency on imported oil which reached 50 percent in the month of January and now stands at 39 percent. After a five-year study, mandated by Congress, the Interior Department's Fish and Wildlife Service has produced a draft report entitled "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment." It is anticipated that the secretary of the interior will shortly be forwarding that report to Congress with the recommendation that exploratory drilling begin, with oil production to follow, hopefully within ten years, via an annex pipeline to the Alaska (Prudhoe Bay) pipeline some 65 miles away.

It should be remembered that environmentalists' predictions of doom to wildlife were trumpeted by the same organizations that opposed the Alaska pipeline a decade ago. Your editor has flown along the Alaska pipeline, condemned as dangerous to the point of extinction to caribou, and witnessed those animals hunched against its warmth and scratching their antlers on it. In fact, Alaskans tell me the caribou love it and the herds have increased three to fivefold since its installation!

The same stale arguments are being advanced against oil exploration in ANWR. The facts are that the oil industry over 40 years has learned to drill for oil in Alaska and export it via pipeline in perfect harmony with the environment. They have learned to *enhance* the environment and not desecrate it, as Mr. Frampton charges. Perhaps the best commentary on this harmony is given by the Inupiat Eskimo people who have the only permanent settlement in the disputed ANWR area. Say they:

Our people have carefully observed Prudhoe Bay's development over the past 18 years. It is our judgment that we can have balanced and carefully regulated oil development on our lands in ANWR and in the Coastal Plain which will preserve the environment and the wildlife resources of ANWR and still benefit our people and the nation.

For the above reasons, and more, the National Strategic Materials and Minerals Program Advisory Committee, composed of 25 broadly based representatives of the mining, user and oil industries, and academia, on February 6 addressed the following letter and recommendation to the secretary of the interior:

Enclosed is a recommendation of the National Strategic Materials and Minerals Program Advis-

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Domestic Oil Production

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ory Committee (NSMMPAC) that you recommend to Congress that the entire area of the Coastal Plain of Alaska's Arctic National Wildlife Refuge be open to oil and gas leasing as proposed in DOI's Draft Report "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment."

The NSMMPAC bases this recommendation on the following considerations:

1. We are gravely concerned about our nation's increasing dependence on foreign sources for oil and gas as well as nonfuel minerals.
2. Unless some constructive action is taken to expand our domestic sources of supply, we fear the prospect of repeating the oil and gas "crises" of 1973 and 1979.
3. The preliminary report has faithfully and accurately complied with the legislative mandate of 1981.
4. We are convinced that the oil and gas leasing of a restricted area within the Arctic National Wildlife Refuge Coastal Plain can be conducted on a basis compatible with all of the important environmental concerns in the region.
5. This committee has a strong commitment to advancing and preserving the fundamental management concept of multiple use of the public lands wherever national interest so dictates.

We request that this letter and the accompanying recommendation be included in the public record.

The recommendation itself follows:

The genuine concern of the National Strategic Materials and Minerals Program Advisory Committee about U.S. dependence on foreign sources for strategic minerals and materials is exemplified by the nation's increasing dependence on oil imports. The Department of the Interior's November 1986 draft report, "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment," produced at the directive of and within the required procedure by Congress, identifies the ANWR Coastal Plain within Alaska's Arctic National Wildlife Refuge as the most significant oil and gas prospect remaining in the United States.

The Committee is satisfied that all required procedures have been met in addressing the important environmental issues and believes that the secretary of the interior, in accordance with Section 1002 of the Alaska National Interest Conservation Act, recommend to Congress that the Coastal Plain of the Arctic National Wild-

life Refuge be made available to oil and gas leasing activities. The committee believes that this action will strengthen the national energy security that is vital to a healthy domestic minerals industry.

And so, the battle is joined in Congress. *Nothing* can happen until Congress takes action—no production of oil and gas from ANWR is allowed, and no leasing or development leading to production can take place. What is in the best interests of national security and the American people? It seems to your editor that the question should answer itself when addressed to right thinking people. The Prudhoe Bay complex now provides 20 to 25 percent of all domestic oil. As its production declines in the 1990s, we should bring the ANWR field on stream for the benefit of *all* our people, and most especially the Alaskans, the vast majority of whom are in favor of exploration and development.

Rosenberg Children Denied Access To Parents' Files

In a recent case (*Meeropol v. Meese*, 790 F. 2d 942, D.C. Circuit, 1986), the District of Columbia Circuit of the U.S. Court of Appeals refused a Freedom of Information Act (FOIA) request to give to the plaintiffs copies of "all government records" concerning their parents, Julius and Ethel Rosenberg, who were convicted in 1951 of conspiring to transmit atomic bomb information to the Soviet Union. They were executed in 1953. The case is still used as a litmus test by the left, as is the case of Alger Hiss, for separating the "true believers" from other liberals. [The plaintiffs were adopted, after the execution of their parents, by an avowed Communist who gave them his name.]

The documents requested were in many government agencies and amounted to more than 500,000 pages. The search by these agencies took several years to locate them all, and many were retrieved only because of references and second references in other documents. Eventually 200,000 pages were found by the defendants not to come under any of FOIA's exceptions, and these were released to the plaintiffs. The plaintiffs sued under FOIA for the remaining 300,000 pages, plus lawyers' fees and litigation costs.

The lower court went to extraordinary lengths to satisfy the plaintiffs' requests, including the compiling of numerous indexes in great detail (which were used as a source for further requests), the ordering of searches of some FBI field offices, *in camera* inspection of samples of documents, etc. The lower court denied relief except for lawyers' fees and litigation costs.

The Court of Appeals noted that this FOIA request "may well be the most demanding FOIA request ever

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Book Review

By David Martin

The Secret War in Central America: Sandinista Assault on World Order by John Norton Moore. University Publications of America, 195 pages, \$17.95.

This book is an expanded version of a lengthy monograph published early last year by the *American Journal of International Law* and summarized in the March issue of *Intelligence Report*.

The monograph was distinguished by the extraordinary clarity and care which Professor John Norton Moore brought to the discussion of a highly complex subject. Professor Moore has succeeded in improving the quality of his presentation by reincarnating it in book form.

One of the world's most renowned professors of international law, Myres S. McDougal of Yale University, offered the following judgment after reading the book: "This book is an extraordinarily comprehensive, profound, and realistic statement of the facts of, and the relevant law about, the global conflict occurring in Central America. It should be required reading for all (including judges of the International Court of Justice) who question the seriousness of the threat of an expansive totalitarianism to the free world."

This reviewer will go beyond Professor McDougal's words. It should be required reading for all who question our policy because only in this way can they test their political perceptions and prejudices against the exhaustive and lucid presentation which John Norton Moore makes in his book. But, in addition, it should be required reading for the very large number of intellectuals who support our present policy because of the simple gut feeling that Communism must be contained. Professor Moore warns that one of the most serious challenges to the future of world order is the Cuban-Nicaraguan secret war against their Central American neighbors. We have failed to face up to this danger, he says, because the international system has difficulty in defining secret aggression and of distinguishing between the right of aggression and the right of defense.

If, in the face of the radical regime assault, the international system becomes increasingly incapable of differentiating aggression and defense, Article 2(4) of the Charter—and its inherent moral and policy rationale for fidelity to law—will truly be dead. And those responsible for that death will be not only the radical regimes, which have warred secretly against it, but also the statesmen, scholars and international lawyers who have permitted it to die through silence, confusion, or a failure to understand that the great principle can be killed as effectively by condemning necessary defense as by failing to condemn aggression. Contrary to the reports of its death, Article 2(4) is not yet dead and must not be permitted to die. The response of the international legal

community to the Central American conflict could well be a turning point in restoring that principle. As such, the Central American conflict deserves more thorough analysis than it has so far received.

He notes that in Latin America as a whole the number of U.S. military advisers has fallen from 516 in 1970 to a total of 70 in 1981. In sharp contrast is the record of Soviet military involvement. Professor Moore says Soviet military deliveries to Cuba jumped from 13,300 metric tons in 1970 to 68,300 in 1982. Cuban military advisers began pulling into Nicaragua on July 19, 1979, the day that the Sandinistas came to power. Today, in addition to 4,000 to 5,000 Cuban civilian advisers, there are some 3,600 Cuban military and security personnel in Nicaragua, and several hundred East bloc Europeans, Libyans, North Koreans, and other Communist bloc personnel.

As an ominous portent of the future, Professor Moore notes that whereas Soviet naval vessels spent only 200 ship days in the South Atlantic in 1970, in 1980 they spent approximately 2,600 ship days, or a 13-fold increase.

Over the last five years, he says, the Soviet Union has provided more military assistance to Cuba and Nicaragua than the United States has provided to all of Latin America.

The Sandinistas have made El Salvador the principal target of their war of subversion in Central America. But Managua does not confine itself to waging its secret war against El Salvador, the most vulnerable of its Central American neighbors. Honduras, Guatemala, and even Costa Rica, the oldest democracy in Central America, which has purposely avoided having armed forces of its own, have all been targets of this secret war. Indeed, the Costa Rican authorities in February of 1985 ordered Nicaragua to reduce its embassy personnel from 47 to 10 as a result of an investigation which documented the existence of a clandestine Cuban-Nicaraguan network in Costa Rica.

Numerous defectors are quoted to support these charges. For example, Eden Pastora Gomez—Comandante Zero—perhaps the most authentic hero produced by the Sandinista revolution, is reported as saying that "when the Managua government . . . was planning the insurrection in El Salvador, I was a participant in the meetings of the National leadership . . ." Moore also quotes Alejandro Montenegro, the former commander in chief of the National Central Guerrilla Front of the People's Revolutionary Army in El Salvador, as reporting major involvement by Nicaragua in assisting the Salvadoran guerrillas.

Despite the numerous provocations listed above, and despite the growing body of evidence that Nicaragua is actively involved with the international terrorist movement (Prime Minister Craxi of Italy, for example, has stated that Nicaragua hosts 44 of Italy's most dangerous

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Book Review

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terrorists), the United States has continued its diplomatic efforts to effect a peaceful settlement in Nicaragua. In October 1982 the United States joined with seven other regional democracies in drawing up the San Jose Declaration, which set forth the conditions which the group considered essential for peace in Nicaragua. The Sandinistas, however, refused to meet with the group's spokesman or even to discuss the principles set forth in the San Jose Declaration. In addition, when Colombia, Panama, Mexico and Venezuela met in Contadora in January 1983 for the purpose of outlining a regional settlement, their efforts were supported by the United States. The Contadora agreement, supported by the OAS, contained a 21-point Document of Objectives, but since that time the talks have bogged down because of basic differences about the problem of verification.

In a final chapter dealing with recurrent misperceptions about the secret war in Central America, Professor Moore points out that while there is broad agreement that the establishment of the Soviet base or the introduction of offensive weapons systems into Nicaragua should be considered adequate cause for a United States response, there has been a tendency to ignore the series of on-going secret attacks against neighboring states, which pose an even clearer cause for response.

"Few who have seriously reviewed the overall evidence," says Professor Moore, "have any doubt that the root of the world order problem in Central America is a serious ongoing secret war directed from Cuba and Nicaragua against neighboring states, particularly El Salvador. The contra policy response is a responsive effort by the democracies to defend against that attack and to create a serious incentive for the attacking regimes to cease their activities."

Under the U.N. Charter, Article 51 permits an immediate response to an attack on a nation or a group of nations "until the Security Council has taken measures necessary to maintain international peace and security." In order to stress the fact that there is no conflict on this point between the Rio Treaty and the U.N. Charter, Article 10 of the Treaty provides that "none of the provisions of this Treaty shall be construed as impairing the rights and obligations of the High Contracting Parties under the Charter of the United Nations."

In a paragraph in the closing chapter Professor Moore deals with proposals, both from the left and right, to modify the clauses of the U.N. Charter and of the Rio Treaty that have to do with the right of self-defense. Says Professor Moore:

In recent years some authors who are aware of the severe radical regime assault on Charter values have proposed a dramatic reinterpretation

of the Charter to permit use of force by the democracies in direct support of human rights and self-determination, or a broader right of defense. The converse of this effort to loosen the Charter standards on use of force has been the less conscious trend, clearly evident in most of the literature on the Central American conflict, to severely restrict the Charter right of defense. In both cases it would seem preferable to adhere to that great dual principle of the Charter that aggressive use of force is prohibited no matter how "just" the cause, and that nations have a right of individual and collective defense, including a right to take effective measures reasonably necessary to promptly end an aggressive attack. Nothing is more likely to contribute to the present sad deterioration in world order than a combination of the "invisible attack" problem in failing to sanction aggressive attack and the "anemic defense" problem in undermining the critical deterrent of effective defense against such attack.

There is much, much more to the Moore book. The best that can be said after this perhaps over-lengthy review is that everyone who pretends to take an intelligent interest in Central America, no matter what his personal inclinations may be, owes it to himself to peruse this book carefully.

Shultz Warns of Strategic Dangers

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Costa Rican Civil Guard unit in an unprovoked attack. Costa Rica—which has no standing army—remains particularly vulnerable to the Nicaraguan military machine.

Colombia became a more recent target. When the M-19 guerrillas attacked the Palace of Justice in 1985 and murdered members of the Colombian Supreme Court and others, they used weapons supplied by the Nicaraguan Communists.

Within a year of seizing power, the comandantes had created an armed force twice the size of Somoza's. Today, their 75,000-man active duty force is by far the largest in Central America.

The first Cuban military advisers arrived in Managua the day the new government took over. Soviets, East Germans, Libyans, North Koreans, Bulgarians and PLO members joined them in short order. Today some 7,000 to 8,000 military and civilian East bloc "advisers" play a role in all aspects of Nicaraguan life—including the organization of such critical functions as the state security apparatus.

The first Soviet-made armor arrived in Nicaragua in early 1981. The mainstay was some 110 Soviet-made T-55 medium tanks, with amphibious capability, to which the comandantes have now added some 30 Soviet

PT-76 light tanks. None of Nicaragua's neighbors has such weapons.

Like Cuba, Nicaragua is becoming a strategic asset to the Soviets. At Punta Huete, the Nicaraguans with Cuban assistance have built a 10,000 foot airstrip, large enough to handle any aircraft in the Soviet arsenal, from high performance MIG fighters to reconnaissance planes (some of which have already begun operations in Nicaragua) to Bear Bombers. A naval port on Nicaragua's Pacific coast would enable the Soviets to fuel and service submarines. In short, in Nicaragua the Soviet Union is putting in place the means to threaten our ability to assist our Asian allies and defend our shipping lines—just as today, from Cuba, it threatens our links to Western Europe and the Middle East.

The United States Response

Before World War II, we agreed with our southern neighbors on many cooperative arrangements to strengthen the countries in the hemisphere, including a collective security arrangement that became a formal treaty obligation in 1947. It was this same Rio Treaty that President Kennedy relied on in 1962 during the Cuban missile crisis. So our concern about Soviet bases in Cuba, and about the steady development of Nicaragua as another Soviet base of operations, is not unique in our history. Quite the contrary: we seek to sustain a policy that has been fundamental to our security and truly bipartisan through all administrations for some 200 years.

Our policy in Central America is solidly based on treaties and international law. When the comandantes in Nicaragua, through their support of guerrillas seeking to overthrow the governments of their neighbors, committed unprovoked and aggressive acts in violation of the Charters of the United Nations and of the Organization of American States, and of the Rio Treaty, they thereby triggered an obligation on the part of the United States to deal promptly and effectively with the aggression. It is, of course, not only an obligation of the United States, but of all members of the Organization of American States.

Many of the programs to implement the strategy voted out by majorities of both houses of Congress and signed by President Reagan have been in place for some time; some were initiated by the previous administration. Bipartisan support for democratic government has yielded dramatic results in El Salvador, Honduras and Guatemala. The Caribbean Basin Initiative, and the economic measures undertaken in response to the report of the National Bipartisan Commission on Central America chaired by Henry Kissinger, have given new hope for the economic development of the Central American region. We have worked—with the American Bar Association, in fact—to improve the administration of justice by building the skills, facilities, and techniques of lawyers, judges, and prosecutors throughout

the hemisphere. Our military assistance, which has been about one-third as much as our economic assistance, has helped El Salvador to turn back Nicaraguan-supported guerrillas and has given a new sense of confidence to the region in general.

The Nicaraguan Democratic Resistance and the Nicaraguan opposition in general have been trying to get the comandantes to the bargaining table. So have the Central American democracies. So have we. The resistance has grown from a handful in 1982 to a force of some 20,000 Nicaraguan volunteers from all elements of society. Despite their inexperience in dealing with the Sandinista Army, trained and equipped by the Soviets and the Cubans, and our own inconstancy in supporting their fight against Communist oppression, they have held on. They are prepared to add their strength to a Nicaraguan population that wants freedom, but has become dispirited through vigorous repression by their own government and a seeming lack of will and vigor on the part of neighbors whom they thought they could depend on. It is simply unrealistic to expect the Nicaraguan people, held hostage with a gun at their head, to put down their oppressors without some guns in their own hands provided by friends and neighbors.

The United States has remained constant in its support for a comprehensive, verifiable and simultaneous implementation of the 21 objectives agreed on by all countries in the Contadora peace process. Our policy objectives are very straightforward. We want a democratic government in Nicaragua. We want the regime there to stop persecuting its people; to respect human rights; and to stop subverting its neighbors. We want the foreign military personnel to go home, whether they are from the Soviet Union or Communist Cuba. We do not want Nicaragua to be a base for our enemies. Nor do Nicaragua's neighbors. The military establishment in Nicaragua must be reduced to what is acceptable to Nicaragua's neighbors so that they do not feel threatened. Nicaragua's leaders must meet the standards that they set for *themselves* when they promised democracy, respect for human rights and a fair system of justice.

This much is certain: Nicaragua will change. The tyranny there is out of step with the aspirations of the Nicaraguan people and the realities of this hemisphere. Nicaragua—as the Communists might say—is on the wrong side of history.

Today's controversy over the Iran arms deal must be dealt with as a matter of purely domestic concern. It is irrelevant to the strategic and moral realities we face in this hemisphere. Our laws must be obeyed and enforced, as the president has made clear. But decisions regarding the security of our nation must look beyond a session of Congress or a presidential term. Those making such decisions must consider the legacy they leave to a future Congress—to all of their successors—and most of all, to the American people.

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Shultz Warns of Strategic Dangers

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The prospect of a second Communist base in our hemisphere will certainly persuade the Soviet Union to go further, confident in their own view that we do not have the will and capacity to defend our friends, our allies, and our interests around the world. The danger ahead is not so much that a people such as ours will yield to a clear and present danger, but that inaction and irresolution in a murky situation today may be costly later on in lives and in every other sense.

By supporting those Nicaraguans now who are fighting for their liberty, we may avoid direct military involvement by the United States in the future.

We cannot become faint-hearted because of the words of those who equate morality with noninvolvement. We must help those willing to fight for their freedom against tyranny. It would be immoral to abandon them.

Nowhere in the world are the stakes higher than they are now in our hemisphere—in Central America. The strategic and moral issues speak for themselves. It is up to us to show the will and the resolve to support those fighting for their independence and their freedom and in so doing for security and freedom in this hemisphere.

Mexico and the United States

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ing, immigration and refugee concerns, and hemispheric security. The severe economic dislocations in the aftermath of the double oil shocks of the seventies, including for Mexico a still unresolved debt crisis, heightened awareness of the serious drug problem, particularly in the United States, and the war in Central America, increasingly have drawn attention to the importance of the Mexico factor.

To explore these issues and, in doing so, to examine ways in which the United States-Mexico relationship might be strengthened, the Standing Committee on Law and National Security in cooperation with the California Western School of Law sponsored a National Security Workshop in San Diego on February 6 and 7. The workshop included an all-star cast of both American and Mexican participants. Panels included: "Background and Overview of the Relationship," "The Changing Economic Structure of Mexico," "Immigration and Refugees," "Maquiladora Operations," "Differing Perceptions in Foreign Policy and Security," and "Political Change and Stability."

The full proceedings of the conference will be published in the *California Western Law Review*. Some of the key points that were made were as follows:

- The United States has a vital contemporary interest in Mexico.
- It is natural and appropriate for the United States to concern itself with Mexican affairs, just as it is natural for the United States to show concern over NATO affairs. However, an exaggerated sensitivity in discussion of such affairs can be construed as an unworthy patronization.
- The enhancement and strengthening of the private sector in Mexico to increase the national economic growth rate is imperative in meeting the current severe economic problems of Mexico.
- If possible, we should encourage the setting aside of old wounds and political differences and work actively and affirmatively to strengthen United States-Mexican relations.
- In view of the strong common interest in protecting self-determination and democratic freedom in the hemisphere, we should seek to work together to halt the Cuban-Nicaraguan secret warfare against their hemispheric neighbors.
- Mexico is performing well in seeking to control excessive population growth.

It is to be hoped that this conference will play a role in alerting policy makers in both Mexico and the United States to the network of strong interdependencies between the two neighboring countries and particularly to the urgent need for strengthening the relationship. The Standing Committee owes a debt of gratitude for their assistance in planning and hosting the conference to Dean Michael H. Dessent of the California Western School of Law, and Professor John E. Noyes, Director of the International Legal Studies Program at the California Western School of Law.

John Norton Moore

Access to Files Denied

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made." It noted that 65 full-time and 21 part-time FBI employees at one time were working solely on the FOIA request to that agency. It also detailed the exhaustive and expensive efforts by all of the government agencies to meet this request and it noted the many and continued allegations by the plaintiffs of bad faith, inadequacy of search, inefficiency, etc.

The Court of Appeals upheld the lower court's actions except that it ordered reprocessing under current disclosure standards of those records processed by the FBI in 1978.

Larry Williams

The views expressed in this publication are not necessarily those of the American Bar Association or the Standing Committee on Law and National Security. Questions or comments should be directed to W.C. Mott, Editor, 217 9th Street, S.E., Washington, D.C. 20003, Tel. 202-543-5445.

Mr. MOTT. Thank you. I will try to get it from the printers because we are very much interested from a national security standpoint. We think that drilling for this oil in the ANWR reserve is the essence of national security.

We have a task force on the exclusive economic zone. The chairman of that task force is the State geologist of the State of California who works very closely with your State geologist of Oklahoma. I had the privilege of going out and speaking to 50 State geologists on the *Queen Mary*—I don't know whether they were going to do prospecting from the *Queen Mary* or not, but we know that there are minerals on the Gorda Ridge. We know that there are minerals offshore. But the problem is that it isn't economic.

Our task force has had a report on the Bureau of Mines Resource Assessment Activities. That's the Bureau of Mines that's here today, in the Gorda Ridge offshore on the west coast of the United States.

We have already advised the Secretary that we intend to appraise the most appropriate means to expedite development of EEZ resources.

I think, Mr. Lewis, we also have an agreement in Florida for some offshore mining. I know we have one in North Carolina, so we feel that this is a valuable resource which needs to be developed. So we are educating the public on that.

Now we come to R&D technology. It's a source of great concern to my Secretary—and Paul tells me that you are going to have him up here later, and I hope you do, he's a very bright lawyer and understands this problem—he's concerned about the state of basic industry in this country. Industrial base erosion is, in his view and in our view, a serious and growing national problem which has already limited our capability to assure adequate raw material processing in times of emergency.

The committee feels strongly that effective research and development depend upon a basic economy that is healthy. We feel confident that the marketplace can develop substitutes that will be economically and technologically sound, as well as developing new processing techniques and new applications for the use of materials and minerals.

Unfortunately, the U.S. industry at present is not healthy. We must examine the host of public policy impediments, including overregulation and tax disincentives which currently encumber minerals research and development. We must increase our efforts to ensure a renewed vigor and competitiveness—that's the word of the hour these days, competitiveness—of our domestic economy as a whole.

So we have an ad hoc group, as I say, that is looking at this whole problem.

We also made a recommendation to the Secretary on stockpile leadership and direction. Now that the Congress has mandated a stockpile manager, I hope it is going to insist that they let the stockpile manager, General Becton, manage. Because if other people take over the task of management, then he will have a very difficult time doing what the Congress has mandated he should do, which is to manage the stockpile.

I have submitted a statement for the record, Mr. Chairman, and I feel that I'd be happy to go into any question that you would like to have me try to answer. I also will take any suggestions from you and your subcommittee as to what our task force on technology and research and development want.

Now when I put on this conference in New York, I had two of the most quintessential scientists in the United States on the program, and they are still around. One of them is Dr. Baker—you probably know Dr. Bill Baker, he's on PFIAB, you'll run into him sooner or later in one of your other assignments. But he's the former head of Bell Laboratories. And the other one is Dr. Arden Bement, who was the head of the National Materials Advisory Board and connected with the Academy of Science. And those people are available to us. We can go out anywhere we want with the Secretary's permission and get consultants to come help us, like Dr. Baker, and Dr. Bement and others of that ilk, and we'll be happy to try to do it.

Finally, I want to issue an invitation to you, Mr. McCurdy. The Congress mandated that the President of the United States should form up a National Security Strategy of the United States and said please submit this by—my senator, John Warner, is the one that did this, and tomorrow morning the former Deputy Head of the CIA, Dr. Ray Cline, is going to discuss this at one of our American Bar breakfasts at 8 o'clock at the University Club, and if you could possibly come and sit next to Dr. Cline to keep him straight, we'd be glad to have you at the head table. And the Assistant Secretary Designate of Interior will be there also.

Mr. McCURDY. Well, that's an interesting invitation. I'll have to check my schedule. I am tempted. I have read a number of Ray Cline's books, and he is not a shy individual, now that he's out of his other assignment, and certainly is an articulate spokesman for many of his views, and I appreciate the invitation.

Admiral Mott, I'm intrigued here—I'm pleased to have finally gotten to meet you and certainly you have raised a number of very, very interesting points, and I'm going to take you up on some of your invitations.

One of those is I think it's important that we have a mineral and materials strategy. And as you know, and in fact you have alluded to it, in the different committee assignments that I have, I have particularly been interested in the strategic materials issue, but also in the R&D and technology development of materials, and also the management issue.

I'm the only person that sits on both Armed Services and Science and Space, and by far the only one that sits on that and Intelligence. And when I went to the Intelligence Committee, I thought, well, perhaps after all these questions I've been raising that I'll find the one person over there that has all this stuff together in one place, that all this magically comes together in the CIA or some place that I just hadn't been reading about it and hadn't seen it.

So once I got over there, I was sadly—became sadly aware of the fact that there is no such person. We need some management here. We need some coordination. If you recall, a few years ago there was the Ankorage Study, Dick Icord did a study in Armed Services

on materials and industrial base problems, and the fact we had a declining industrial base. And that—I don't see that we have come very far from that original study of identifying many of the problems.

And what I am concerned about is—and I think this is—your committee is the closest thing I've seen so far to provide some outside advice to particular agencies regarding the extent of the problem and the need for some coordination and coordinated study of these problems. And I would hope that in your summit meeting, the meeting you're having in Charlottesville, that you would raise the issue and start having your group look at not only the Bureau of Mines, but also other efforts that are being undertaken, and actively pursue the issue who is responsible for all this, and is it being done. What are the long-term goals, what are the objectives, and I'm new to this particular subcommittee—I've been on this committee for 6 years, and I don't know the Bureau's activities as well as I do in other areas, but I'm going to know them pretty quickly.

It strikes me, when I first look at that, someone doesn't think this is much of a priority, if it continues to get all the cuts and the rest of the agency seems to float along. And, you know, if your committee studies it and looks at it and as we should or anyone else, and finds out that there shouldn't be a bill, tell us, fine, let us recommend—you know, I like to save money, too. I'm not sure that's going to be the case. I don't think it is, but I'd like—you know, I'd like to get some of your input on that. And since you do have access to—easy access to the Secretary and other members, I think that you could offer a unique perspective, and I'd appreciate your efforts there.

Mr. MOTT. I will talk to the Secretary about it, sir, and see what he wants me to do.

Mr. McCURDY. Good. Well, tell him there's a lot of Congressional support up here in places, and there are some critical questions being raised that he should be interested in.

Secretary Hodel has been generally supportive of many issues that I've been interested in over the years, and you mentioned energy independence, and I'm glad Secretary Herrington is finally coming around to it. He still hasn't gotten there all the way, and I don't think he fully understands the—what I see the depth of the problem to be from a national security standpoint, but he's getting better.

Mr. MOTT. You may know my fellow admiral, Admiral Kirkpatrick out in Oklahoma.

Mr. McCURDY. I know him well, I sure do. And he's a very important person there. But I think it's important that we continue to move in those directions.

You mentioned Secretary Hodel had asked that your committee work on the National Critical Materials Council and the issue of education. Can you expand on that statement just a bit, and what types of educational issues are you going to be looking at?

Mr. MOTT. Well, if you go around the country, as I do, to high school teachers, you quickly find out that high school teachers who are educating our children really don't know anything about the importance of minerals in our society.

And there is an organization out in Denver called the Minerals Information Institute. They have a remarkable—I spoke out there at Lowrey Air Force Base but most of the people were in the education business from the Colorado School of Mines or somewhere. And this man, his name is Christenson, has introduced courses, not only in the schools in Colorado, the public schools, in high schools about the importance of minerals, but he has spread it to California. He has spread it, and I believe, Mr. Lewis, to Florida, I think there is a program education going on in the public schools in Florida, through Dave Heatwole, a member of our committee, we have one up in Alaska.

The problem is, I was speaking at the University of Arizona and there were a bunch of kids in the audience who came to monitor it, most of them were Ph.D's from all over the world, and I told these kids the story about a lady who went to the movies in Miami, and the program had a 10-minute short subject on the challenge of the earth and minerals, and she wrote a letter saying she couldn't understand why they chose to exhibit a film that glorified the rape of the earth. There was a scene showing a huge electric shovel loading broken rock into a mammoth off highway truck.

And in reply she was informed that the broken rock was copper, silver, ore being mined in Arizona. Without copper wire the motion picture projector could not have operated. Without silver no picture could have appeared on the screen.

Moreover, the fire laws of Miami required that the theater in which she sat had to be constructed primarily of mine materials rather than wood, flammable, vegetable matter. If the earth was indeed being raped by the act of mining, the rape was being conducted in part to enable her and others to see the motion picture.

Now, I have a couple of philanthropoids on my committee, Mr. Chairman. A philanthropoid is a man who gives away other people's money. One of them, Mason Walsh, represents the Mellon Bank in Pittsburgh, he was a member of the Conservation Society, as I recall, and he also represents the Mellon Foundation. And he took a look at what this outfit was doing out there and promptly gave them \$100,000. Now they have come to me and they want me to raise more money for them.

We need nationwide education on the importance of minerals in our society. It just doesn't exist. You take—people don't realize—I come from a military background, you know, we couldn't build a tank, a plane, a ship, not even one of John Lehman's 600 ships unless we had the kind of minerals that we don't have in this country. And I, you know, it may be controversial with you, but our committee voted unanimously against sanctions in South Africa. We thought it was a mistake. We still think it was a mistake. Sanctions have never worked. In our committee people have had experience with them.

Now, we have a situation where we have exempted some of the strategic minerals that are coming from South Africa, but there is some pressure by certain members of the August body which you represent, to make the Secretary of State include them. And we would be in a sorry state if that came to pass, for the simple reason, that the other major source of most of those minerals is

Soviet Union. And it's not a source upon which we should put great reliance.

So, we are doing the best we can to expand education. I knock myself out going around the country, so do most of my committee members. One of them, Andy Andrews, who has testified before this committee in the past. Has he not, Paul? He's the Vice President of Allegheny International. He went out to San Diego to talk about the importance of cobalt and chromium. And the business editor of the San Diego Union came and he said, "Well," he said, "You know, that's very interesting, Mr. Andrews, we don't have the cobalt and chromium here in San Diego." So, his answer was, "Well, have you got any good hospitals here?" "Oh, yeah, I got a lot of good hospitals." He said, "Close them down. You can't operate it without cobalt and chromium in the doctor's instrument. And in the sanitation. You got any good restaurants here?" "Yeah." He said, "Fine, close them down." He said, "What's that thing going up and down across the street there?" He said, "That's an oil drilling rig." He said, "Close that down. You can't drill—you can't make the drill bit without chromium and cobalt."

So, this is—and, of course, then the business editor went back and wrote a story. But it never occurred to him that chromium and cobalt were important in San Diego, California.

So, that's what we're up against.

Mr. McCURDY. Well, I think you do have real service when you look at the educational issues, and we hope that it, perhaps, can be incorporated in some of the agencies, at least their profile, their responsibilities.

I don't know if this is the proper time, but being Chairman I guess I'll use it. There is a particular thing that disturbs me a lot from the three committees in which I work, and that is, and you're aware that PFIAB is of the intelligence community. It's a fact that we don't do very good economic intelligence, and one of those is materials issue.

And I've recently received a glossy brochure from the Japanese outlining their efforts to duplicate and actually enhance our LANDSAT system, basically, which we developed for billions of dollars; and also, to compete with the French SPOT system, and we're going to lose our system, by the way, because OMB is—because their attitude is going to fall through the cracks of LANDSAT.

And some day we're going to be sitting here with no economic intelligence collection system. And I wonder why MITI is so interested in putting their Government's money with corporate sector in developing this system if it's not—if any country understands the importance of minerals and the location of minerals from an economic standpoint, it would be Japan.

And I think we—this is a personal request, I would hope that you would talk to Carlucci and others that you have familiar, you know, that you're familiar with and work with, to stress upon them the need that we not lose a system such as this.

Mr. MORR. Well, Mr. Chairman, I should tell you, I guess, that I'm Vice President and General Counsel of a Defense Think Tank called the National Strategy Information Center in New York. They're the ones that published this book on strategic minerals.

The founding director—the founding director of that organization was a New York lawyer named Bill Casey. And I was very close to Bill, God rest him, I hope he recovers. But I could pick up the phone and chat him about some of the things you just mentioned, about the fact that the economic information that we were getting in the minerals area was not as good as it should be. And he would invite me to come out, and I would talk to him.

Now, another good friend of mine is going to become head of the CIA, if he's confirmed up here. And I've already written to Judge Webster and said, "Look, I'd like to continue the same kind of association that I had with Bill Casey with you, if we can be helpful to you."

You're right, that we haven't had the kind of economic intelligence that we should have. And I've had a long association with this. I used to be the drafter of all Congressional statements for the Chairman of the Joint Chief of Staff, two of them. And it was terribly difficult for me to, in the top secret hearings they used to have up here in what we used to call the—oh, the annual posture briefings, to get the kind of intelligence that the chairman could give them. And nobody agreed with anybody else. I had to fight with the Air Force, and fight with my own service, the Army, and the CIA; they would come in with different intelligence estimates.

So, I will keep on it to the best of my ability, sir.

Mr. McCURDY. Well, I think we're going to have some further communication. I appreciate your frankness today. And I'm sure your posture statements were more interesting than some of the ones we're getting here recently, at least livelier, I'm sure they were.

Mr. Lewis.

Mr. LEWIS. Thank you, Mr. Chairman.

You almost sound like a human library on some of these things, Admiral Mott.

You state in the status—

Mr. MOTT. I'm so old, Mr. Lewis. I've read a lot of books, you know. I'm the same age as the President, although I don't know how many books on the subject he's read.

Mr. LEWIS. Well, I'm not going to touch that.

Mr. McCURDY. We're not going to touch that.

Mr. LEWIS. You state in the status of your strategic materials and minerals that the United States industry is not healthy, and the consequence are indeed has been severely cut. And I guess I'd like to know what type of research has been cut?

Mr. MOTT. Well, I think it's in the budgets of the various corporations. One of the people that you might want to call up here, Mr. Chairman, is Bobby Inman. You know, Bobby is a former head of Naval Intelligence, a former head of NSA, former Deputy of CIA. And he went down to Austin to set up an organization, to look into the very—the answers to the very kinds of questions that Mr. Lewis is asking, you know, what's wrong with research and development?

And I, one day, had four Japanese cameramen appear at my house in Charlottesville wanting to do a film for public television in Japan on minerals, and on the stockpile. And I said, "Well, you know, I used to be an aide to President Roosevelt and I know that

you guys started a war because you couldn't get the kind of things you wanted." But I said, "I know about your basic research." The Japanese do basic research in long 10-year segments. We don't do that in this country. They spend a hell of a lot of money on basic research, not really knowing what's going to come out at the other end. And we should encourage our people to do that as much as we can.

Incidentally, I said to them, "One of your big problems is that you're the most mineral starved nation in the industrial world. And you don't have a stockpile. And you better start getting one or you may get in the same kind of trouble you got into before World War II was started."

This is the kind of a question, Mr. Lewis, that somebody like Arden Bement who is the Vice President for Technology of TRW. And, you know, TRW makes the fans for the engines of jets and everything else. Because he was the head of the National Materials Board at the National Academy of Science, he could answer this question which you just asked in chapter and verse; and I think you should get an expert like that who is from industry.

Another one would be a member of my committee, Mr. Hebel, who is the President of Boeing Electronics. I don't know what kind of a budget they have. But I know, because I've spent some time in Japan and in Korea, that they look for the long haul on research, basic research. But, of course, their government is behind everything their companies do. I'm not so sure our's is.

Mr. LEWIS. Another question. You mentioned that it's imperative that your stockpile management system be consolidated within a single agency. And you go further in stating in a clause, a governmental corporation would be the answer. Could you elaborate on that just slightly?

Mr. MOTT. Well, one of the members of our committee, Simon Strauss, who wrote this book, "Trouble In the Third Kingdom," and has been a friend of Dr. Morgan's for over 40-years, was in the stockpile business back in World War II and also in the Korean War. And it was his idea and the idea of the subcommittee I had on this that, the management of the stockpile ought to be insulated from government pressures, from OMB, and so on. And the only way to do that would be to set up a quasi government corporation, which would have to come from the Congress, and they would be the managers of the stockpile. And it would not be terribly expensive because it could be financed by certain sales from the stockpile. That was our preferred solution to the problem, a quasi government corporation.

We may yet introduce a bill on that, Mr. Lewis. And we're working on draft legislation. But in the meantime, we felt the best man in the administration to do this was the head of the Federal Emergency Management Agency, who the head of it happens to be Julius Becton right now, but they've got some very good people down there. And we've offered our help to them, whatever help we could be.

Mr. LEWIS. One very important question. Since you've taken the job you probably haven't been able to go back to Charlottesville and reduce your handicap, have you been able to maintain it?

Mr. MOTT. Sir, I live on a golf course. I belong to the Chevy Chase Club or the Burning Tree Club. I resigned from the Burning Tree Club. I figured out it cost me over \$400 a year to play nine holes. But I still belong to the Chevy Chase Club, and I played a total of nine holes there and nine holes in Farmington last year. I'm going to do better this summer.

Mr. LEWIS. Well, good, keep working on it.

Mr. MOTT. Yes, sir.

Mr. LEWIS. Thank you, Mr. Chairman.

Mr. McCURDY. Thank you, Mr. Lewis.

Admiral, I mentioned earlier that you're working with the National Critical Minerals Council on the issue of education, do you anticipate working with them in assessing national materials needs, and the requirement of the public law creating the Council?

Mr. MOTT. Well, I would answer this question by saying that, I twisted the arm of our secretary to take over the chairmanship of that committee. A friend of mine was going to call President Reagan and get him to nominate me to be the chairman of that Materials Council and I said, "Oh, no." It happened to be Joe Coors, by the way, out in Colorado. And I said,—and, by the way, he's into minerals, too, you know, he's the head of the International Ceramics Association and has a big plant out there. But I said, "Don't do that to me. That's worse than what I have now. You get Don Hodel to take it." So, Don Hodel took it, and he sent for me and he said, "OK, Bill," he said, "You twisted my arm, but you guys are going to be my staff."

So, the answer to your question is, we are going to do everything to help Don Hodel, and that up to this point, moribund council to do whatever he wants to do; we're his voice, on call.

Mr. McCURDY. Well, I hope you'll be more than that. I think it's important that information flows up to them, and I hope that you operate an aggressive an independent shop to try to alert that council of some of the overall needs. And also, the fact that there has to be some overall coordination in management, which is technically their responsibility. And, you know, I haven't seen much being done.

You mentioned earlier, we were talking about—

Mr. MOTT. Didn't somebody say he's already writing and asked for our advice.

Mr. McCURDY. Good. Good. I think it's important that you have an arrangement like that and work from it.

You mentioned the other gentleman from Florida, Mr. Bennett and the questions of the stockpile. One of the concerns that I've had, and he and I have had some discussions in this regard, is that some of the materials that we were stockpiling were obsolete or low quality, and maybe even the wrong materials, that we had a huge supply of silver for a long, long time, and it took a while to convince them to move some of that out and look at other materials. What is your view with regard to the stockpile?

Mr. MOTT. Well, Mr. McCurdy, I feel that there should be, beginning as soon as possible, a reassessment of all the stockpile goals and the materials in the stockpile.

The one that Admiral Poindexter got the President to sign off on has never been formally sent to the Congress. It—what happened

up here was that you people got so mad, and I'm talking now principally about Congressman Bennett and others that they put a rider on the—I think it was the Defense appropriation bill, that no sales or buys would be made from the stockpile. None. Is that correct?

And that's the way it stands right now. This is—one of the things that I told the Attorney General, I said, "Look, Ed," I said, "Your relations on this stockpile issue up there are terrible. You ought to send somebody of stature, maybe even yourself to go up and talk to Congressman Bennett." Because I said, "He's so mad, I understand he's introduced a bill to abolish the whole National Security Council."

Mr. McCURDY. Well, he has, as a matter of fact, which I disagree with him on. But I think there's some other areas of disagreement, and not being critical, I think it's important, again, that—and I mentioned Frank Carlucci, I do so intentionally, I think he is a capable person who's in a very big job right now and it's important that he be alerted to some of these concerns; and that this would be a good initiative for them to be moving into anyway, and reassessment of the stockpile and looking at issues like LANDSAT and others are going to have to start flowing across his desk. And I don't think they have at this point.

And I think he's educable on some of these points. I don't think he has any built in bias.

And I'd also say that there's some of us who are on those committees that haven't been here as long as Mr. Bennett, but are somewhat active in these areas; we'll be glad to work with you on stockpile and other issues.

Mr. MORR. I've got to go over and kid Mr. Bennett about this bill he has put in, because I was, at one time, aide to President Truman, and I was taking a walk with him one morning at 6 o'clock and just make conversation. I said to him, "Mr. President, why did you send the National Security Act up to the Congress?" And he said, "Well," he said, "You know, you ought to know the answer to that because you were with my predecessor and neither I or the Vice President and the Secretary of State were ever consulted at all in the formulation of foreign policy. We didn't even know when the President was out of town." And he said, "I thought it was a hell of a way to run a railroad, and I was a creature of the Congress, and the short answer to your question, Commander, I was then a Commander, is that I didn't want another Vice President to become President of the United States as ignorant as I was in the formulation of foreign policy, that's why I set up a statutory body." And that worked pretty well with Truman. It worked well with Eisenhower. But when Kennedy came in, you know, he thought his Harvard boys could do this a lot better than the National Security Council.

If you look at the record you'll find that there was not one single meeting of the National Security Council for the first six months of the Kennedy administration, and the result, you know very well, was a disaster.

And this is what's happened to the National Security Council. In my opinion, the staff took over from the collegial body that Truman envisaged to advise him. And until that situation is—by

the way, our committee the American Bar, the one that invites you to come to breakfast tomorrow is going to have a dinner with Frank Carlucci.

Mr. McCURDY. Good, and I hope you do.

I could—never mind, I could stay here all day and visit with you, and would be totally intrigued, but we have other witnesses. But I wanted to raise just—again, there's a great—I don't know if you've read it yet, and this is off the record, we don't even need to have this part—it's entitled Dulles. I met Eleanor Dulles the other evening, some 94—

Mr. MOTT. Charming lady.

Mr. McCURDY [continuing]. 94 years old, and she was—I mean, she's absolutely incredible and tremendous mental and physical condition and shape for those years. And I was reading the book and had an opportunity to discuss it with her and I just thought you—I figured you did know her, considering the span of administrations that you worked in.

Mr. MOTT. I knew both Dulles boys. And I knew her, too.

Mr. McCURDY. Well, unfortunately, I had to read about a lot of these people, but it has been fascinating. And I look forward to meeting with you later sometime and discussing these.

Mr. MOTT. Thank you, sir.

Mr. McCURDY. Thanks for the invitation. I have a meeting at 8:00 in the morning, unfortunately, my staff indicates, but perhaps at a later time we can do that.

Mr. MOTT. I'll tell Ray Cline you were afraid that he might say something to you that you would disagree with him.

Mr. McCURDY. Well, he and I occasionally have clashed except that I have a great deal of respect for his abilities.

Mr. MOTT. Yes, sir. Thank you very much.

Mr. McCURDY. Well, Mr. Director, you were kind in letting Admiral Mott go before you, except that you build a pretty tall fence to have to overcome and crawl over it to follow that act. He's remarkable, and I know that he did a good job, but Admiral Mott certainly was very informative.

For our record, we have Robert C. Horton, Director, Bureau of Mines, Department of the Interior, for his authorization and review, and your statement will be officially admitted into the record, and we look forward to your testimony today.

STATEMENT OF MR. ROBERT C. HORTON, DIRECTOR, BUREAU OF MINES, DEPARTMENT OF THE INTERIOR

Mr. HORTON. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, if I may speak briefly on a subject, I think of interest to you. As we approach the 21st century, requirements for advanced materials will push against the current frontiers of science and technology, resulting in new demands on our economy. Materials having special properties already are required to meet critical material and space applications. Similar requirements are needed by the industrial sector.

We are entering the age of advanced materials, however our success in meeting that challenge will depend on our ability to produce the metal raw materials from which to fabricate the fin-

ished products. Many of the minerals and metals required occur as byproducts with primary metals, such as gallium with aluminum, and germanium with zinc. Since these byproducts are present in very low concentrations, their recovery is difficult and costly.

Unfortunately, mineral producers make no attempt to recover such byproducts without a sufficiently high value in their primary metal. Furthermore, the current decline in our domestic production of primary metals, and an increase in shipment of concentrates overseas for processing results in a loss of our potential for recovering many byproducts that will be vital to our high technology requirements.

To provide the needed technologies, a major portion of our minerals research program addresses extraction and recovery technologies for those minerals and metals that are marginally economic today, but are essential to our national security and economic needs. A portion of the effort seeks to enhance mineral processing efficiency by providing the technologies to automate metallurgical processes to help enhance the nation's international competitiveness.

Complimentary to the research underway to produce minerals and metals from primary and secondary sources, is the research conducted in the broad fields of materials. The mineral industries not only are producers, but also are consumers of materials, many of which contain high concentrations of critical metals needed for special performance characteristics.

Crushing and grinding equipment, high-pressure containment vessels for corrosive processes, and high temperature refractories are examples of materials that must withstand rigorous conditions. The research materials program conducts research to minimize the loss of such materials through the use of substitute metals and nonmetals and to develop improvement minerals having superior properties.

Research on advanced materials emphasizes composites, the joining of metals and ceramics, and rapidly solidified alloys. The concept used to develop materials for aerospace and high technology applications serve as a basis for producing high performance materials for use in minerals and metals production.

As the world's leading industrial nation, the United States has tremendous quantities of materials in circulation. The materials costs, whether they were produced originally here or abroad, already have been paid. The materials either can be reused, that is, recycled, or thrown away and replaced by more costly replacements. The Bureau is the foremost Federal agency is conducting recycling research, and as such provides new and innovative technologies for effectively conserving materials.

The management of mineral waste requires special attention. The competitiveness of the domestic mineral industry is threatened both from subsidized competition abroad, and from increasing pressure for a cleaner environment at home. Not only do wastes presently being generated require proper disposal, and hence innovative treatment technologies, but waste generated from earlier mining and mineral processing operations present potential hazards to the environment. The nation just has begun to realize the enormity of this problem.

You noted in your statement, Mr. Chairman, our recently completed agreements with the American Mining Congress for reviewing our mining research activity, and with the Mining and Metallurgical Society of America for reviewing our minerals and materials technology research. We look forward to this—to a long-term effort in this area with those two organizations.

As part of our continuing efforts to keep this Committee informed about potential relocations, you should know that before our next hearing with this Committee, the Bureau's headquarters offices will probably have been moved. The GSA has informed the Bureau that it must vacate its present headquarters offices in Columbia Plaza within a year so the building can be renovated. GSA is seeking new space for the Bureau. It is vital that the new location selected provide ready access to the many other Federal agencies, such as the Departments of State, Interior, Energy, Commerce, Defense and various independent agencies with which the Bureau must interact in carrying out its programs. It's also important that ready access for our clients, members of the mining industry be provided.

Thank you, Mr. Chairman. That concludes my statement. I would be pleased to answer any question you may have.

[The prepared statement of Mr. Robert Horton follows:]

Statement of
Robert C. Horton
Director, Bureau of Mines
Department of the Interior
before the
House Committee on Science, Space and Technology
Subcommittee on Transportation, Aviation and Materials
March 18, 1987

Mr. Chairman and Members of the Committee:

It is my pleasure to appear before you today to discuss the Bureau of Mines programs and the budget request of \$118,630,000 for the Mines and Minerals appropriation for fiscal year 1988. Within that request, we propose \$70,809,000 for Minerals Research, \$29,052,000 for Minerals Information and Analysis, and \$18,769,000 for General Administration.

For FY 1988 the Bureau proposes several important new thrusts and resource reallocations which more clearly focus the priorities toward achieving the goals contained in "Project 2000 - A Strategic Plan for the Bureau of Mines." The changes essentially channel some of the Bureau's unique research and analytical talents toward several current and emerging problems significantly affecting the health and global competitiveness of the domestic mining and minerals industry. The Bureau seeks to take greater advantage of opportunities to impact several critical policy issues, influence and accelerate technological innovations, better anticipate and prepare for future market conditions, and improve worker health and safety. Emphasis is given to: mining and processing automation; robotics; artificial intelligence; computer integrated systems; high-technology metals and advanced materials, particularly in intermetallic compounds and ceramics; plasma physics; biotechnology; water and soil contamination; regulatory analysis; enhanced information dissemination; and strategic and critical minerals recovery.

The research priorities in particular are directed, where appropriate, to the application of advanced technologies which promise revolutionary rather than evolutionary or incremental improvements, while, at the same time, continuing the Bureau's strong commitment to basic research. Such changes in base technology can help make American mining and mineral processing industries more innovative and competitive in global markets. The FY 1988 budget includes two efforts not previously proposed in the Bureau of Mines program: abandoned mine land research, which was transferred to the Bureau from the Office of Surface Mining Reclamation and Enforcement (OSM) in the continuing resolution that provided FY 1987 funding for Federal programs, and regulatory project coordination, a new office established during 1986.

I am sure that you are aware that we are completing implementation of our January 6 decision to close our Avondale Research Center. The decision to close one of the six Research Centers currently operated under the Minerals and Materials Research program was not demanded by any single event. Rather, it was required by the collective events of the past several years during which budget requests and subsequent appropriations declined while many unit costs increased. The aggregate result was that resources, funds, and personnel were too thinly spread and diminishing operational efficiencies became unacceptable. Consolidation of research activities, the closure of one Research Center and the distribution of its resources and programs among the remaining five Research Centers will alleviate the operational inefficiencies and substantially strengthen the

research program. The Avondale center had the smallest permanent staff and the least involvement with a locally based minerals industry of any Bureau center. The Bureau has offered transfers to a higher proportion of the staff, at lower overall cost, than it could at any other center. Of the forty two full time permanent employees, fourteen have accepted their transfer offers, three have transferred elsewhere in the Bureau, three have accepted other Federal positions, six have retired, one has resigned, and fifteen were separated with severance pay.

MINERALS INFORMATION

Minerals related policy studies, defense mobilization planning, land assessment decisions and minerals research priorities all rely on the availability of minerals information. It is imperative that this information base be maintained and continually refined to assure its accuracy and timeliness in the formulation of industrial and Federal policies as they relate to the minerals and materials sector. Changes in industry structure and demand patterns for mineral commodities and materials, technological advances, increased dependence of the United States on imports for a number of minerals and metals, all affect minerals information needs. To meet these evolving data requirements, the proposed budget includes a \$466,000 program increase. This increase will fund preparation of a Mineral Perspectives publication covering major mineral developments in China and their impact on the U.S. economy and U.S. investment opportunities. It will also fund a study to define the opportunities for innovation in disseminating minerals information that are offered by electronic data storage, transmission, and display techniques, thereby reducing publication costs. In addition, because of the emerging strategic and economic importance of advanced technology in the United States, the Bureau is expanding the scope of its program to examine advanced technology-related minerals and metals, especially those with defense, space, medical and communications applications.

MINERAL DATA ANALYSIS

The emphasis of the Mineral Data Analysis program in FY 1988 will be on the analysis of structural change in the mineral industry on international competitiveness issues affecting the minerals position of the United States, including the impact made by high-tech materials. Additional emphasis will be placed on the analysis of the economic impact of regulatory action on the Nation's mineral industry to provide badly needed input to regulatory policymaking. The analysis of direct and indirect national economic impacts of an import supply disruption in selected strategic materials will continue and will provide a basis for evaluating policy proposals for actions to minimize domestic impacts. A new study will investigate the impact of trade agreements and tariffs and other factors of production on the U.S. minerals industry.

The Bureau will continue to assess the opportunities for recovering strategic and critical minerals in the Exclusive Economic Zone. Land-based resources of strategic and critical minerals in the western states and Alaska will also be assessed to determine their potential contribution to the U.S. mineral supply. Published information about selected deposits in China will be evaluated to assess the impact of their potential production on world markets.

The Bureau also will continue to provide detailed mineral resource information on public lands to assist in determining the potential for the economic development of those resources and for other land-use decisions. In addition, the Bureau will supply expert evaluations needed in expanding the domestic supply of

resources, particularly strategic and critical minerals. Efforts will be directed towards conducting the national forest mineral surveys, five of which will be underway by FY 1988. Work in Alaska will include mineral investigations of the Juneau and Valdez Creek Mining Districts.

RESEARCH OVERVIEW

The FY 1988 budget process has been used as a mechanism for directing internal changes in the Bureau's mineral research programs. In all three programs, (Minerals and Materials Technology, Health and Safety Technology, and Mining Technology) there is an annual turnover of projects as ongoing work is completed and new work is started. There is also a shifting of resources among ongoing projects as they move through phases when more or fewer resources are required to accomplish their objectives. The Bureau has used these opportunities to redirect research efforts within the funding targets available to more sharply focus its scientific and engineering talents upon those areas with the greatest potential for carrying out the Bureau's mission and the President's program.

MINERALS AND MATERIALS TECHNOLOGY

The Minerals and Materials Research activity has been retitled and restructured as Minerals and Materials Technology to reflect innovation in mineral processing and mineral based materials to make processing less costly; to make the domestic industry more competitive; and to investigate new techniques and materials. Research efforts will apply high technological solutions of mineral and materials processing, including projects in genetic engineering to apply biotechnology for minerals recovery and effluent treatment; inorganic membrane research; joining technology for rapidly solidified alloys (RSA) and ceramics; application of plasma technology for ceramics, carbothermic reduction of alumina, and silicon nitride refractories; use of supercritical fluids for metal extraction; use of ultrasound to enhance solvent extraction and leaching; nondestructive evaluation of materials using pulsed lasers and ultrasonic techniques; and use of intermetallic and transitional materials as substitutes for platinum in catalysts. Much of this work will be accomplished under contract by the Idaho National Engineering Laboratory.

In its inhouse program the Bureau will begin a major research effort to adapt and extend its highly developed metallurgical techniques to better understand and deal with problems of water contamination that are associated with mineral production. This research will provide technology to help our mining and mineral processing industries meet costly and increasingly stringent environmental requirements and also to recover scarce mineral values that are now being dispersed into the environment. Such specialized treatment technologies can help complement traditional pollutant control strategies of concern to the Department of the Interior and the Nation as a whole.

The Bureau will also step up development of technologies for removing inorganic contaminants such as cyanide, arsenic, and heavy metals from soils. This too is a major and growing problem for the industry in decontaminating mining and mineral processing waste disposal areas to achieve compliance with environmental standards. Additional resources will be devoted to research in advanced materials which can be used to improve mining and processing efficiencies and which can require the use of traditional metals in new forms (e.g. dispersed, impregnated, and intermetallic ceramic composites). Emphasis will also be placed on application of automated controls in minerals processing to improve cost and recovery effectiveness.

MINING RESEARCH

Finding new ways to improve worker health and safety remains a principal Bureau concern. Since the Bureau's establishment in 1910, its Health and Safety research has helped the mining industry to achieve major gains in health and safety for its workforce. Despite these improvements, however, the death rate from mining accidents is still several times the average for all industries. Since it already is impractical to remove all hazards from the miners, further improvement must be accomplished by removing the miners from the hazards; in other words, by remote control of all mining operations. To make this possible, Bureau research will take the lead in both the development and transfer of such emerging technologies as robotics, expert systems, and automation. Increased use of these advanced technologies will not only help to make mining safer and more healthful, but will also improve productivity and the industry's global competitiveness. For these reasons, the Bureau is accelerating the redirection of its Health and Safety and Mining Technology research toward this field. Since these high technologies have applications in several of the traditional research areas, they are included under Ground Control and Industrial Hazards in the Health and Safety program as well as the Advanced Mining Technology program.

In their action on the Department of the Interior's FY 1987 budget, the Congress transferred Abandoned Mine Reclamation Research, authorized by Title IV of the Surface Mining Control and Reclamation Act, from the Office of Surface Mining Reclamation and Enforcement to the Bureau of Mines. The funds required for this research, therefore, appear in the Bureau's budget for the first time this year.

An additional inhouse research thrust in Mining Technology is being placed on in situ (or solution) mining. Compared to conventional mining technologies, in situ mining promises to be less environmentally disruptive, less capital intensive, and to pose fewer health and safety hazards for its workers. It also has the potential of allowing economic exploitation of small and/or low grade deposits which cannot be developed with conventional technologies. The Congress made additions to the Bureau's FY 1986 and 1987 budgets for engineering design of a demonstration project to use this technology for copper mining; this work will be completed during 1987. The Bureau intends to augment the necessary laboratory work needed to apply this technology to other types of deposits, including those containing strategic and critical minerals.

GENERAL ADMINISTRATION

A significant change proposed is a base adjustment transfer from General Administration to Mining Research. These resources have been used to provide facility support, operation, and maintenance services at the Pittsburgh Research Center. Transferring the resources to the programs for which they provide support has several advantages. First, it corrects an anomaly in funding these costs which dates back to earlier years when most of the Bureau's programs had activities in the Pittsburgh area, and including them under General Administration was the most sensible administrative arrangement. Second, it also improves the management of the Bureau's resources by making the Research Director at Pittsburgh directly responsible for the people and resources supporting the maintenance and operation of his facility.

HELIUM OPERATIONS

Under the provisions of the Helium Act of 1960, as amended, the Bureau of Mines has been providing helium needed by Federal agencies, primarily the Departments

of Defense and Energy and the National Aeronautics and Space Administration. It has also been storing and conserving the Nation's helium resources. These activities have been funded through a revolving fund financed principally from offsetting collections received from other Federal agencies who purchase helium from the Bureau. In FY 1988, the Administration proposes to privatize these activities by sale of the Bureau's helium refining and distribution facilities to a private operator, while retaining Federal ownership of the existing helium reserves. This operator would then provide for Federal agency needs by withdrawing Federally owned helium from the existing reserves. Legislation will be proposed to forgive the existing debt to the Treasury, which financed the acquisition of the helium reserve, plant, and equipment, and all future revenues would be passed on to the Treasury.

A contract will be awarded early in 1987 to assess the estimated market value of the helium operation, and define the steps needed to sell the program's assets, while assuring the continued availability of helium for government operations. Using the results of the assessment, private industry bids will be solicited.

Mr. Chairman, that concludes my prepared statement, and I will be happy to respond to your questions.

Mr. McCURDY. Thank you, Director Horton. As I stated in my opening statement, this Chairman is concerned about the—what appears to be disproportionate cuts in your budget as compared to the remainder of the Department of Interior's. Why is it that the Bureau is being cut by more than six times—its personnel is being cut six times more than the rest of the department, when it only represents 3 percent of the total personnel.

And also in looking at the OMB Interior passback numbers, the Bureau's original request is \$8 million less than the final request, and even accounting for the salary and retirement costs, your request is still smaller than the one you received from OMB. Where is the reluctance? Why are you reluctant to push for more funding, and if you don't ask for the funding, who will? And what's the basis for these cuts?

Mr. HORTON. I'm not reluctant to push, and I have actively pushed in those areas. It's the perhaps unpleasant duty of the Secretary and his staff to determine the priorities within the Department of Interior, and allocate proportionately funds to the various agencies. Some get more, some get less. In this instance, the Bureau of Mines has received less perhaps than the average, but that such—that is the situation when one sets priorities.

I tracked the OMB passback that you mentioned a little bit. This year was somewhat confusing because of additions to the Bureau budget, not only by pay raise and a new retirement system, but \$1.9 million was added after our request went to OMB for the abandoned mine land program. That was in an action of Congress late in the session, after our budget document had been pretty well worked up.

The numbers, to make sure we're talking the same numbers, the mark that we received from Interior for our budget was \$107,100,000. The budget request we submitted to Interior was \$110,600,000. It included only a \$3.5 million addition for funding the research work done by the Idaho National Engineering Laboratory. The estimate the Department sent to OMB included \$110,600,000 plus a \$586,000 adjustment for standard level user charges, and \$59,000 for workmen's compensation, which made it \$111,245. The passback from OMB, if I was to compare it to the \$111,245, the passback from OMB was \$108,978,000 to which was added \$1,900,000 for the abandoned mine land fund. Pardon, I shouldn't have said abandoned mine land fund, abandoned mine land research activities was transferred from the Office of Surface Mining to the Bureau of Mines in the last Congress. \$2,395,000 for a pay raise, and \$5,357,000 for the new retirement system, giving a total of \$118,630,000.

Mr. McCURDY. And your request was \$110,600,000?

Mr. HORTON. That was the Department's request to OMB. Yes, and our request in a sense—that was our request to the Department and the Department requested the same amount from OMB plus two technical add-ons, if you will, for the standard level user charges, and a small charge for workmen's compensation.

Mr. McCURDY. How much was your request last year?

Mr. HORTON. \$107,100,000 if my memory serves me right. Last year was the same, \$107,100,000.

Mr. McCURDY. So it was the same. You requested a freeze in effect?

Mr. HORTON. Yes. That was the same mark that we received from Interior within which to fit our budget.

Mr. McCURDY. How much of the research dollars are for external R&D, such as the Idaho National Engineering Laboratory, and how much of the cuts are external versus internal?

Mr. HORTON. Of the \$118,630,000, the only exterior one in it is the Idaho National Engineering Lab for \$3 million.

Mr. McCURDY. How much money is being transferred from the general administration's account to mining research?

Mr. HORTON. \$1.8 million, I'm advised.

Mr. McCURDY. Does the \$18.8 million requested from general administration reflect this change?

Mr. HORTON. Yes.

Mr. McCURDY. Are there any real—is there any real decline in either personnel or funding from this account?

Mr. HORTON. From the general administration account?

Mr. McCURDY. Yes.

Mr. HORTON. Yes. In personnel, general administration was 347 FTEs in 1987, and 318 projected for 1988.

Mr. McCURDY. The Bureau has decided to close the Avondale Maryland Laboratory. Can you tell us why and what research was being performed there, and who will be doing that now?

Mr. HORTON. For the past—over the past 2 years, we have faced the problem of having to consolidate our research as the staff of the Bureau of Mines has declined, and as appropriations have declined, it has been more and more difficult to fund some of the research centers.

Now in the past we've operated 10 research centers, 4 of them in mining research, and 6 in minerals and materials. It is the 6 in minerals and materials that included the Avondale, and where the problem arose is that the staffing in those 6 laboratories was becoming quite thin, the payrolls were a higher and higher percentage of our costs, and it was not effective management wise to continue operating in the 6 laboratories.

A decision had to be made to close one of the laboratories. We looked long and hard for a sore thumb, and one obvious one to close. There were no sore thumbs. We finally settled on the—on Avondale for several reasons as the one that should be closed, which we have now done.

Mr. McCURDY. The thermodynamics facility in Albany was restored but only at one third of its original budget and personnel. What programs were eliminated, and will the Bureau continue to publish the basic thermodynamic data as in the past, and will that facility be maintained throughout fiscal year 1988, and are there any further closings envisioned?

Mr. HORTON. The last one first. I do not envision any closings for the balance of 1987 or in 1988. In looking at OMB projections I don't see any closings necessary if those projections continue.

The thermodynamics lab at Albany is reduced—is operating at a much reduced level, approximately \$300,000 as opposed to \$800,000 budget previously. It was a considered decision for managers and myself responsible in the Bureau that we could no longer afford in

terms of priorities to do general thermodynamics work, and that instead, we would have to limit the thermodynamics work to that necessary to support the Bureau of Mines work. The thermodynamics program in the past—and it's been active for many, many years—has essentially covered all of the compounds of interest to the Bureau and to the extractive minerals industry. There is without question additional thermodynamics work—continuing thermodynamics work required in advanced materials, but advanced materials are not a responsibility of the Bureau of Mines. It would be appropriate for the laboratories and agencies that are charged with that duty to provide the thermodynamics from their own funds. Our priority is the viability of the domestic minerals industry, and it's to that effort which we must concentrate our attention.

Mr. McCURDY. The Academy of Sciences obviously has some differences of opinion as to your role there. Would you care to comment? Are they just—what was the term the admiral used? Philanthropods or something—philanthropoids or whatever that was? Philanthropoids?

Mr. HORTON. Philanthropoids. The National Academy of Science turned out a very kind report on our thermodynamics effort when they reviewed it 3 or 4 years ago. I believe they were commenting on the quality of the effort, and that the effort was required within the United States, and I would not argue with that at all. It's in what areas should the Bureau of Mines be concentrating its effort in line with decreasing budgets and decreasing staff, and we felt we could no longer afford that effort.

Now I think it's important to point out to you, Mr. Chairman, that the closing of Avondale and the reduction in effort in the thermodynamics is not a unique occurrence. I have been Director for 5½ years now, and during that time it's been necessary to close the Boulder City Engineering Laboratory in Boulder City, Nevada, my own home state. That was the first action.

To cease the metallurgy research efforts at our Twin Cities Research Center which was largely mining research, but with a substantial component in metallurgy research. We have stopped that research activity. We transferred our clay testing program from the Tuscaloosa Research Center to the University of Alabama. We closed the Eastern Field Operations Center and have made other small adjustments, as the budgets and appropriations have decreased. As I mentioned, I look forward to the cessation of that heretofore necessary activity.

Mr. McCURDY. Where will this data be collected in the future if you no longer do the thermodynamic research there on advanced materials? What coordination is there to ensure that such work is carried on?

Mr. HORTON. I don't believe that's a responsibility of the Bureau of Mines any longer. I don't know I could answer as to who might—

Mr. McCURDY. Well perhaps the Department of Interior knows something. I understand that you're at a certain level, but it appears to me that when we're—when you performed a function for a considerable amount of time, then for it to all of a sudden for it to be cancelled, at least have some intellectual curiosity of who will

be taking up that slack, if the work is necessary. Now if you just say it's not necessary, that's a different point.

Mr. HORTON. No; the thermodynamics research in advanced materials is necessary. The material such as would be available will be available as in the past in the published literature. Those involved with thermodynamics usually are familiar with the published literature. Most of the material we have published has been our own work. Consolidations, correlations should be undertaken by those people concerned with the advanced materials.

Mr. McCURDY. But you don't know who that is?

Mr. HORTON. No; I am in the mining business, sir.

Mr. McCURDY. How are the new advisory groups, the American Mining Congress and the Mining Metallurgical Society of America, being used in determining research priorities within the Bureau?

Mr. HORTON. Both organizations are currently visiting our research centers. In the past few months we've had briefings for them to acquaint them, familiarize them with our research programs. They will visit individual research centers, review the projects and programs, then report back to me their findings and their suggestions. But we look at this as a continuing effort.

Mr. McCURDY. Do you see a role for the Critical Materials Council and/or the Mott Committee. You've heard our discussions previously on that?

Mr. HORTON. Well, the Critical Materials Council—we're supporting substantial support for the efforts of that Council. I don't know that I see a role for Admiral Mott's Committee as regards the Bureau of Mines, but that would be at the Secretary's determination.

With the review by the American Mining Congress, and the Mining and Metallurgical Society of America, I don't know that Admiral Mott's group would particularly add to it. We do provide substantial information, data, to Admiral Mott's group as well. We are familiar with their work, and many of the individuals on that committee are familiar with our work. And I have a high regard for the membership as Admiral Mott obviously does.

Mr. McCURDY. What is the role of basic research, I mean within your priorities for minerals and materials? Is it still a priority, or is it no longer a priority? Basic research on materials?

Mr. HORTON. The reason I'm hesitating is what the role is depends on what one's definition of basic research is. Basic research in the mining industry is quite some different than basic research in physics. We're not looking—the Bureau of Mines, and most research labs in mining are not attempting to determine the basic laws of physics or chemistry, but rather to apply them. Now we do some base research in the sense that it's generic in mineral applications. Chemical reactions, physical reactions, and that does enjoy a high priority.

Mr. McCURDY. Well, the Bureau continues to target the Mineral Institute's program for elimination just by continuing reversal, by this body. Is the Mineral Institute's program not effective?

Mr. HORTON. No, the Mineral Institute's program is very effective. I wouldn't demean it for a moment. They do some very good work. We're proud of some of the projects and efforts of the Mineral Institutes. But it's the feeling of the Administration that that

effort is more properly supported by the states and by industry, rather than by the Federal Government.

Mr. McCURDY. Unfortunately, most of the mineral rich and energy rich states are no longer rich because of some—the current market and some of the economics, and those states unfortunately are not in a position to support a lot of that basic research.

I know of some instances, one where there's—one of the institutes is at the University of Oklahoma which has done energy research and materials research for a number of years, and yet they received, I think a 17-percent reduction this year from the state. It's in line with a 2-years previous about 10 percent cuts in university funding.

That's just one example, so I'm not so sure that the states are going to pick up and the private sector, certainly they're not even interested in a lot exploration right now, much less basic research, so I just put that out for what it's worth. I think it's something you need to look at.

Mr. HORTON. I would like to mention, Mr. Chairman, that the activities, the nature of the activities in mineral institutes varies widely from university to university. In some places it's a simple entry on the university books, and a professor of mining or geology may distribute some grants, scholarships to the students.

In other universities, it's a real brick and mortar building with substantial staff and substantial contribution by the state. I believe in Kentucky, the mineral institute and associated activities have a budget of about \$85 million and a large, large building. The University of Alabama has a very large active program, where our funding is not a substantial fraction. In other universities, it is a major fraction.

Mr. McCURDY. I'd invite you, by the way, to visit the university's energy and research center at the University of Oklahoma in Norman sometime. They just completed a \$36 million facility, and the state kicked in a major funding—it has no Federal funding, yet it has considerable private resources and I think that it would be of interest if you can arrange it.

With that, I will see if my colleague from Maryland has any questions at this point?

Mr. McMILLEN. Thank you very much.

I know the Admiral has testified and had to leave, but one of the questions that I'm just curious about as I look at this is the possibilities of ocean mining and what kind of technologies are being developed in those areas and how promising, in your opinion, would be ocean exploration?

Mr. HORTON. We have recently done some economics studies on some of the near-shore resources, but I would speak for the whole subject.

In the development of the technology, quite a few years ago when manganese nodules were high on an interest list, the Bureau of Mines did quite a bit of work in developing technology, and there were four or five large consortiums that also looked at developing technology. I don't believe that any full commercial-sized operations or pieces of equipment were ever constructed. No one ever mined the manganese nodules.

But included in the EEZ are near-shore sand and gravel deposits which could be mined immediately, gold deposits off of Alaska which are currently being mined, phosphate deposits off of California and off the Eastern United States which will be mined when they are economic compared to the near-shore resources.

As one gets into deeper waters, you truly get into deeper waters.

Besides the manganese nodules, there are two other types of deposits, and that is cobalt-rich manganese crusts that occur on some of the islands in the South Pacific, where we recently funded, in part, a large sampling activity off Johnson Island where we recovered eight tons of cobalt-manganese crust. When I say "cobalt-manganese crust," it's largely manganese. The cobalt is from a few tenths of a percent to perhaps as high as two percent.

It's my personal opinion that the near-shore ones obviously will be mined first, the sand and the gravel, as they're required. The gold is being mined now. The phosphates perhaps next.

If we did hit a long-term crisis in the supply of cobalt, it's likely that those manganese crusts in the South Pacific would be mined next.

The other ones I haven't touched on are the smokers or the mineral deposits being deposited at spreading centers, where one sees pictures in National Geographic with weird worms, clams, and other life forms. Those are quite deep, are largely copper, zinc, and some silver. I think it will be many, many years before those are mined, well into the next century and perhaps a century beyond, in that there are adequate resources on shore that must be mined first—that would be mined first.

Mr. McMILLEN. In the last year of his presidency, President Carter promulgated the Carter Doctrine, which said the United States would go to war to protect our supplies.

Other than oil, what minerals or which countries do you think would fall under those categories?

Mr. HORTON. It would be chromite and platinum from South Africa. We import substantial quantities of manganese from South Africa, but there are alternate sources of manganese which would probably be adequate to serve.

There is really no substitute, though, for the platinum and the chromite, other than from the Soviet Union.

Mr. McMILLEN. Maybe that can lead into my next question as to advanced materials. Could you provide more details as to the nature of your advanced materials program?

Mr. HORTON. Yes.

[The material referred to follows:]

ADVANCED MATERIALS PROGRAM

Because of the emerging strategic and economic importance of advanced materials technology in the United States, the Bureau of Mines is expanding the scope of its overall effort related to this area. This affects both the data collection activities and the research program in this area.

The data collection and analysis programs are being broadened to specifically include advanced technology-related minerals, metals and other materials, especially those with defense, space, medical, and communications applications. The Bureau will document, report, and analyze consumption and end-use data for the materials used in these high-technology applications. These data will be used by the Bureau of Mines and others to examine the impact made by high-technology materials on the structure of the minerals industry. In addition, quantitative analysis of the substitu-

tion likely to occur between base metals such as iron and steel, copper, and others, and nonmetallic materials such as polymers and ceramics will be carried out to provide estimates of the probable substitution of these materials through the year 2000.

The Bureau of Mines has also redirected part of its Minerals and Materials Research program to reflect the changing nature of materials in our economy. Part of this redirection is reflected in the evolving nature of the base research effort. Virtually every element in the periodic table is required to make the wide range of advanced materials available today. Many of these elements occur as byproducts of primary metals production. Both generic extractive metallurgy research to make domestic primary metals more competitive in the world marketplace, and research to develop specific recovery technologies for subeconomic byproducts are underway. The former is essential to help reduce the loss of domestic high-technology byproducts that accompanies the loss of the primary industries to overseas suppliers.

In addition, as noted in the Fiscal Year 1988 Budget, the Bureau is focusing a component of its overall research program on research that specifically addresses the development of advanced materials and related processing technologies. Examples of this work include:

Metallic materials

- (1) New techniques for joining, compaction, and nondestructive evaluation of alloys produced from rapid solidification powders.
- (2) New techniques for joining dissimilar and reactive metals for automobile, electronic, mining, and other advanced applications.
- (3) New techniques for coating metals to impart wear and corrosion resistance as well as to conserve critical and strategic metals.
- (4) New alloys that reduce the need for critical and strategic metals, particularly chromium.
- (5) New intermetallic reinforced alloys.
- (6) New titanium alloy powder forming techniques for use in near-net-shape forming.

Nonmetallic materials

- (1) New fine-particle raw materials for advanced ceramic and ceramic-ceramic composites using the Bureau-developed "turbomilling" process.
- (2) Advanced ceramic materials based on complex oxide-nitride compositions for high-temperatures use.
- (3) Advanced ceramic composites using colloidal impregnation techniques.
- (4) Advanced furnace refractories using carbon and graphite fibers to substitute for the imported flake graphite now being used.
- (5) New techniques for the joining and nondestructive evaluation of advanced silicon nitride ceramics.
- (6) Improved sulfur-based polymers for acid and salt corrosion resistance, including composites using fibrous reinforcements for construction applications requiring high strength.

Mr. McMILLEN. And how is the funding distributed for ceramics and composites and other alloys.

Mr. HORTON. Most of our work in the advanced materials is now being conducted at the Idaho National Engineering Laboratory where they are looking at methods to join ceramics and composites, new catalysts, perhaps possible substitutes for platinum, and in our own work in new materials for wear and corrosion.

Our funding in that area now is, for '88, is proposed at \$3,742,000.

And one other I should mention that has been of substantial interest to me is in grinding of some of the high tech materials, niobium, some of the other hardcoating materials where it's essential to get them very fine, and grinding has been one of the problems, and we've got large experience in comminution and grinding. We've been doing some work in that area.

Mr. McMILLEN. Based on the funding levels that you indicated, in your opinion, looking at these advanced materials and their promise, and given your understanding of what other agencies are

doing in this regard, do you think that we are doing enough with respect to this program, particularly vis-a-vis the Japanese and other nations?

I mean, are we woefully inadequate? Are we about on target, or are we—

Mr. HORTON. I've never met anybody that didn't feel qualified to give that answer, except when I shave in the morning. No one really knows what work is being done in that area in total in the United States. Much of it is proprietary and of concern. I'm sure if firms see a substantial profit, that they're working hard at it.

We are familiar with some of the work the Air Force does. We've been consulting with the Air Force now for a couple of years. We have a meeting going on right now at the Bureau of Mines with the Air Force, discussing some of their needs in the high technology area.

In our minerals information, we are starting a new initiative to collect more information on advanced materials, consumption and production data, and the same in the policy analysis.

It's very difficult, because one is starting fresh in an area where statistics have not generally been collected. You're not even sure what you're going to collect. But we are addressing the problem and would hope to have it better identified shortly.

Mr. McMILLEN. I guess my follow-up on that is, who is in charge of coordinating this, I guess, national policy?

Mr. HORTON. I don't think anybody is in charge, and I don't think anybody ever has been. Perhaps the first argument should be—and I don't have the answer—should anybody be in charge?

The best experts on materials are those that have but a surface education in it, because then you could speak very learnedly about what should be done. We see that in mining. And very soon, using mining as an example, you can't discuss the mineral situation in the United States; you've got to talk about it commodity by commodity, and the same thing, I would think, in advanced materials.

I don't know if any federal agency, if it were given the total responsibility, could collect the data of what's going on. One might find out from the individual national labs. A fair amount of it probably would be classified, and you couldn't report it anyway. And in industry, industry is likely to be very reluctant to share it with you.

Mr. McMILLEN. Well, I just—you know, being new to this process, my comment is that the great thing about this committee is that we're supposed to look to the future, and when you see the Japanese spending on the order of 100 times what we're spending, at least, you know, in other areas, it bothers me, and, you know, are we just, you know, totally missing the boat here?

I'm not necessarily comfortable with the answers that you're giving. I haven't been comfortable with any of the answers that we've received in this regard.

Mr. HORTON. Well, let me give you part of the reasons for perhaps your uncomfortableness with my answers, and that is, repeating, having heard many so-called experts on mining who are not too well educated on the subject and make many mistakes, I hesitate to speak in fields that I'm not familiar with.

The responsibility of the Bureau of Mines is not in advanced materials particularly. It's in the—from the face of the mine through the crushing and the grinding and the extraction of the material, the smelting of it and the refining of it. The Bureau of Mines's responsibility ends there.

It continues again in recycling when we pick up the scrap, because that's another good mine. But in between, it is someone else's responsibility. I have a hard enough time understanding my own.

Mr. McMILLEN. Well, in closing, I just want to say that it's estimated that we're spending \$50 million on structural ceramics. The Japanese spend about in the neighborhood of \$100 to \$300 million. And I guess we'll continue to try to dig this out, figure out if there should be—if we should have a policy in this regard, because common sense would seem to dictate it.

Thank you, Mr. Chairman.

Mr. McCURDY. I thank the gentleman.

The gentleman from Florida?

Mr. LEWIS. Thank you, Mr. Chairman.

Let me try another way. Has the Bureau of Mines considered the future safety, health, and technology demands in its development of the fiscal 1988 budget?

Mr. HORTON. Yes, sir. The Bureau indeed does have a long-range plan; 1½ years ago, 2 years ago, we worked very hard and developed Project 2000, a strategic plan for the Bureau of Mines. If you don't have copies of that document, I'll be pleased to supply them. It is a long-range plan for all activities of the Bureau.

Shorter range plans and priorities, I think are demonstrated in our budget.

Mr. LEWIS. Let's see. Have you coordinated your research efforts with NASA, and if so, could you give us some short explanation?

I mean, Admiral Mott displayed a photo with all of these metals that are involved in the shuttle.

Mr. HORTON. Yes.

Mr. LEWIS. And I'm just wondering if—it seemed to me that with what we have in our space program, that you would want to walk hand in hand with NASA. Have you been doing anything like this?

Mr. HORTON. No. That's fabricated materials. NASA is not too interested in mining. We've done some work with NASA on mining on the moon. But as far as the source of the materials, I don't think NASA has expressed any particular interest to us.

We do relate with NASA in one other area, and that's in the helium conservation program which the Bureau operates for the Government. We supply all the helium that NASA uses.

Mr. LEWIS. That's interesting. A major concern in phosphate mining, particularly in Florida, is the disposal of mining tailings which have a significant radon contamination level.

Does the Bureau have any research underway regarding phosphate mining at all?

Mr. HORTON. Yes. We've spent several millions of dollars in Florida in phosphate mining, helping them with their waste disposal problem, not particularly aligned at the radon problem, but at the large amount of slimes that they must dispose of, and have developed a technique and built pilot plants, which have operated at

several plants in Florida, and the technology has been adopted by some of the plants, and others are concerned—are looking at it, using a flocculation agent, polyethylene oxide, which reduces the settling time for some of those ponds from 30 years to a few months.

This doesn't solve the radon problem, but it solves the disposal of the slimes and the reclamation of the ponds.

Mr. LEWIS. Yes. That's in the reclamation program.

Mr. HORTON. Yes. You might be interested, that same technology has been transferred to handling slimes in clay processing now, in coal, and last summer and again this summer, we'll be using the same technology in Alaska, trying to help Alaska placer miners solve some of their stream contamination problems. It all originated with our work in Florida.

Mr. LEWIS. I don't have any further questions, Mr. Chairman.

Thank you, Mr. Horton.

Mr. McCURDY. Thank you, Mr. Lewis.

Mr. Director, the Bureau has new initiatives this year in use of artificial intelligence and automation in robotics for mining and mineral processing.

How much will be spent on these initiatives?

Mr. HORTON. Mr. Chairman, I have that here, but that widespread, it would take me time to find it. Could we just supply that for the record?

Mr. McCURDY. You can provide that for the record. Yes, we're going to have a series of written questions that we'll be submitting anyway.

[Information to be furnished follows:]

FUNDING FOR AUTOMATION AND ROBOTICS INITIATIVES

Proposed fiscal year 1988 funding for new initiatives in the use of artificial intelligence and automation in robotics for mining and mineral processing is as follows:

Health and safety technology:

Fundamental investigation of robotics in mining	\$620,000
Autonomous navigation in mining.....	430,000
Improved automation systems	125,000
Total, health and safety technology	1,175,000

Mining technology:

Advanced sensors and controls	440,000
Coal interface detector.....	490,000
Adaptive learning network	350,000
Equipment diagnostics.....	410,000

Total, mining technology.....	1,690,000
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Total, mining research.....	2,865,000
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Mr. McCURDY. Do you know where the work will be conducted in this area, and also will there be some coordination with NBS and DARPA and the National Science Foundation, other agencies?

Mr. HORTON. Yes, in that we work with some of them. The work will be done at our research centers again. In mining, we have four research centers. Pittsburgh has been pretty much the lead agency on the automation, working with Carnegie-Mellon Institute, which has the leading national laboratory in robotics.

Automation for mineral processing is pretty well distributed across the five mineral and materials research laboratories.

The problem in mining and robotics is not developing a robot miner, and that's what many people think about robots. It's controlling the present equipment or modified equipment to do the mining without a man being present.

To be able to do that, one has to develop sensors that allow the equipment to know where it is and what it's doing. You don't want a coal-mining machine to be mining the roof or the floor and missing the coal. So development of sensors is one of the first steps in the automation of that equipment.

We have had some successes in those areas and are pursuing it. We are able now to have a miner remote from a continuous miner and operated, but he must be able to see it while he operates it. The next step then is to take him out of the mine altogether and have the instrument do it—the equipment do its own mining.

Mr. McCURDY. A general question about—roughly how many mining companies are there in the United States?

Mr. HORTON. Hundreds, in coal and in metal mining.

Mr. McCURDY. What would you consider the state of the health of the industry today in 1987?

Mr. HORTON. Let me split them up a little bit. Coal mining, for the last 2 or 3 years, has produced near record amounts of coal, and yet the coal industry would complain about their profit levels. The reasons for those complaints are real, but it is not because of any foreign competition or any activity—any economic activity related to the Government.

It's because the coal industry believed the Carter Administration when—and I'm not faulting the Carter Administration in this case; somebody else might have come up with the same numbers—but during the fuel crisis, they said we would need 1,500 million tons of coal by this time, by 1986, 1987, 1988. The coal industry believed them and started building the capacity.

There is gross surplus capacity, capacity able to turn out much more than the all-time highs that they have been producing. As a result, the higher cost mines and the smaller mines have been forced to close. There is internal competition, and prices are down.

In the metal mining, setting aside gold for the moment, prices are generally low. The mining companies that have survived—and most of them have—have done a fantastic job of reducing costs. They have not disappeared.

In the copper industry, for example, in 1981, production was about 1,400,000 tons of copper. Last year, about 1,100,000 tons, about 70 percent of the previous year's.

In accomplishing that, though, the mining companies have dropped their costs from perhaps 85 to 90 cents a pound, down to 55 cents a pound, to make a profit.

The long-term outlook for metal mining in the United States—copper, iron ore, lead, zinc—is that it will be at a lesser scale than it was before for two reasons—lesser or lower demand and also greater competition from overseas, imports from overseas.

Gold mining, conversely, is booming. That's the only part of the mining industry perhaps today, metal mining, that is enjoying boom times, and that's true throughout the world, not just in the

United States, because of the very generous price of gold, which also promises to stay there for some time, at least in the \$300 to \$500 price range. Most mines today are operating at costs of \$200, \$250 an ounce, some of them as low as \$100 an ounce, and they're selling it for 400-plus. They're not much interested in going into other mining activities.

In the industrial minerals, the ones that people don't commonly think about, it's a mixed bag. The fertilizer products, phosphate and potash, are depressed because farmers aren't buying as much fertilizer as they were before.

In some of the other areas, though, business is doing very well. Gypsum, making gypsum board, construction, goes with the housing industry; that's doing quite well, as are some of the other specialty industrial minerals.

Gross production last year was a little over \$23 billion, and that compares with an all time high of about \$24, \$25 billion in 1981. The dollar is not worth today what it was in 1981 or something, but a large part of the industry is doing well.

The metal industry, no.

Mr. McCURDY. That's interesting. One last question for me. Really in the future and the question of exploration, have we—are we confident as to the existing knowledge of known resources throughout the United States first, and then neighboring regions and kind of branching out from there, are most areas—I assume in the United States they are, but what about Central and South America, for instance—what is the state of knowledge of the potential for mining in different materials, and where is the—is there any frontier left, I guess?

Mr. HORTON. There are some frontiers left. Largely, excluding the continental United States, the lower 48, and Europe, the rest of the world remains almost a frontier, and Alaska remains a frontier.

But as for the status of exploration, if in 1960 you had asked the best geologists and mineral persons in the world how many gold mines might be discovered in Nevada between 1960 and 1990, you would probably have gotten an answer of one, two, perhaps three. There are 267 operating right now.

Now if there is any state in the Union that was well prospected for gold and silver before 1960, it was Nevada. Two things have acted to do that. One is the price. But more importantly, it was the large number of new types of deposits that geologists only began understanding in about 1975.

The straight answer to how well do we know the geology of the United States and how many mineral deposits remain is incomplete. It is incomplete knowledge. We don't know yet what deposit may yet be found.

Because of the geologic settings in which certain deposits occur, you may be rather confident about some not occurring, and that would be chromite and platinum, which occur in older rocks, largely basic in chemical character. There aren't very many exposures of those types of rocks in the United States.

Even that aside, there is an opportunity that those types of deposits may be discovered at depth in the Midwest on a geologic extension from Canada that's now deeply buried beneath sediments.

It is one of my principal concerns that the indiscriminate assignment of wilderness areas within the United States, in that even when the U.S. Geological Survey and the Bureau of Mines do their very best to describe the mineral deposits in those areas—and wilderness areas are often nominated and voted in before that information is ever collected—but even once it is collected, one can only say about what you have seen, and not what remains unseen.

I mentioned the gold in Nevada. At the start of World War II, there was a tremendous shortage of tungsten and concern with tungsten. It was fortunate at that time that a portable black light, an ultraviolet light, was developed that a miner could carry. The principal mineral of tungsten is scheelite which fluoresces under ultraviolet light, fluoresces a star-white color.

Prospectors went out in the hills of the West and found literally thousands of tungsten mines that were totally unsuspected before.

When Madame Curie was looking for radium in the early days, large searches in the Western United States, particularly in Colorado where some uranium ore was mined, the price was established by the Federal Government to buy uranium, and uranium became a viable mineral. The portable Geiger counter was developed and later the scintilometer. We had uranium deposits almost scattered throughout the West, which were totally unsuspected before.

New techniques of exploration, new models for the occurrence of minerals, new genetic settings are continually discovered and result in new deposits totally unsuspected before.

Mr. McCURDY. Well, what is the status of institutions such as the Colorado School of Mines and other universities? How is their health in this current economy?

Mr. HORTON. Well, student-wise, not well. I don't have numbers in mind for geologists, but a professor at the South Dakota School of Mines has done a study on mining engineers recently, and if my memory serves me, at the present time in the United States there are approximately 450 senior mining engineering students, 106 freshmen. Supply and demand is what is controlling there, and certainly parallel things are taking place in geology. That drops the faculty-student ratio, and as you well know, colleges get funded on their faculty-student ratio, and the funding is not going very well for most of the mining school.

Mr. McCURDY. It's not going good for the geology schools.

Mr. HORTON. Or geology.

Mr. McCURDY. That, too.

Mr. HORTON. Yes. Now geologists have it a little better in that they can switch into some other fields—hydrology, environmental geology becoming more important.

But there is a serious question and arguments within industry as to how many mining engineers will be required and how many geologists will be required. It's a smaller industry now.

Mr. McCURDY. Very good. Mr. Lewis, anything further?

Mr. LEWIS. No questions.

Mr. McCURDY. If not, thank you, Mr. Horton, and we will have, as I said, a few questions that we'd like some follow-up on, and we appreciate your testimony today.

Mr. HORTON. Thank you, Mr. Chairman.

Mr. McCURDY. Thank you. We are adjourned.

[Whereupon, at 3:50 p.m., the hearing was adjourned.]